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LIPPINCOTT'S NURSING MANUALS

AN INTRODUCTION TO APPLIED PSYCHOLOGY FOR NURSES

BY

DONALD A. LAIRD

Assistant Professor of Psychology, University of Wyoming

LIPPINCOTT'S NURSING MANUALS

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LIPPINCOTT'S NURSING MANUALS

APPLIED PSYCHOLOGY FOR NURSES

AN INTRODUCTION TO

BY

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ILLUSTRATED



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"DEDICATED TO THE NURSE WHO WOULD UNDERSTAND HER
OWN MENTAL LIFE AND TO THE PATIENT, WHOSE MENTAL
LIFE SHOULD BE UNDERSTOOD BY THE NURSE."

PREFACE

WE are living in an age of applied science. Electricity, chemistry and mathematics are being used in the practical work of everyday life. A short while ago these were merely the toys of the scientist. To-day they contribute to our modern efficiency. This change is more than an indication of modern progress—the sciences are in part a cause of the progressive development of our modern conditions of living.

As a science, psychology is one of the youngest. It is scarcely able to walk alone. But the youngest child usually appears most promising to the parents and maiden aunts. So it is with psychology; it is a field of science that has for some time been watched with expectant interest from all sides. Much has been expected from psychology, much has been rendered by psychology. It has not been found wanting in all justifiable expectations.

Psychology may be young as a science, but it is, perhaps, the most ancient in interest. From time immemorial, men have been interested in the behavior of men. What other people do, say, and think has always occupied the centre of interest in human beings. The study of the mental aspects of life probably had its incentive in the desire to know how to deal with others. We may imagine Eve as the first applied psychologist when she suggested that Adam eat the forbidden fruit. Religions have been making heroic efforts, ever since then, to apply psychology so that the mental life of those following their faiths will enable them to resist forbidden fruits.

This book is the result of an attempt to select from the vast literature of psychology those facts that will be of most immediate aid to nurses in understanding the patient, themselves, and their fellow-men, as organisms that act, think, and feel. I have endeavored to avoid all controversial matter that is not borne out by fact. The point of view from which the facts are presented is *biological*. This does not alter the fact or applications. But it

does seem to further the intelligent understanding of the behavior of human beings.

The text of the book is divided into four parts. *Part One* is introductory in nature. *Part Two* presents the biological foundations of behavior. In *Part Three* the more practical results of the biological adaptations at the psychological level are presented. Part Three may be read independently of the others. For it to be perused with understanding, however, it is essential that Part Two be read previously. It may be that those with medical or nursing training have had equivalent instruction. At any rate at least a hasty browsing through Part Two is highly desirable. In *Part Four*, certain aspects of Mental Hygiene, not taken up in other parts of the book, are considered.

Portions of the book have appeared in magazines and journals. I am indebted to the editor of the *Medical Record* for permission to use certain portions of Part Two which I have had published in that journal. Some of the material in other parts of the book has appeared, in a somewhat different form, in *The American Journal of Nursing* and *The Trained Nurse and Hospital Review*. I am also indebted to the editors of these publications for the privilege of re-issuing these articles in their present form.

Acknowledgment for the permission to use illustrations should also be made to the following: Dr. Harold S. Hulburt, Dr. Bird T. Baldwin, Dr. Charles Bernstein, The Lakeside Publishing Co., The Archives of Surgery, W. B. Saunders Co., D. Appleton and Co., Dr. Robert M. Yerkes, The National Academy of Sciences, William Wood & Co.

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March 1, 1923.
Medicine Bow Mountains,
Wyoming.

THE AUTHOR.

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PART I
INTRODUCTORY

AN INTRODUCTION TO APPLIED PSYCHOLOGY FOR NURSES

CHAPTER I

WHAT SHOULD BE EXPECTED FROM PSYCHOLOGY?

What Should be Expected from Psychology—The Study of Behavior—
Self-help from Psychology—Psychology as an Applied
Science—Predicting Behavior—Studying the Patient

Psychology—what does the word bring to your mind? It is a word which is coming to be frequently used, and frequently in meanings and situations which lead the psychologist to throw up his hands in horror. But at that, it has come of late years to be a word held very much in esteem by everyone, even though they may have a grossly erroneous notion of just what psychology is and does.

The hard headed man of business has come to look to psychology for very definite information pertaining to the management of his business. At the other extreme we find the religious revivalist, carefully studying the motives by which men are influenced that he may use these motives for his best purposes. The advertiser uses some very definite psychological tricks, and studies further in psychology that he may advertise better, and in a more effective way, than does his competitor.

The trained teacher also makes definite use of psychology. Many states require that their better paid teachers have a thorough preparation in psychology; most states demand that their accredited high

schools be staffed by a force of teachers who have, without exception, completed a certain minimal amount of work in psychology.

Advertising and selling, hiring and firing, teaching and preaching, these and many other phases of human activity are coming more and more to be approached from the point of view of psychology. Why is it that these varied occupations should find it desirable to have a background of psychological information for the efficient pursuit of their work? Psychology must be of some value to them, or else it would have been thrown overboard long ago for something more useful. Certain it is that it is not a fad; it must have something practical to furnish these practical people who use it in practical life.

Let us try to figure out what there is about psychology that makes it a valuable adjunct for the teacher, the preacher, the seller, the hirer. Then let us see if it may not be of service to the nurse.

THE STUDY OF BEHAVIOR

The preacher is concerned more or less explicitly with men's souls. Perhaps, then, psychology is the study of the soul, since the preacher makes use of this field of knowledge. But business men are, as a rule, not intensely interested in the welfare of the souls of their customers. And still, they find as much of practical usefulness in psychology as does the preacher. It is apparent that psychology is not simply the study of **the soul**. Neither can we limit our conception of the field of psychology to the study of **the mind**. Modern psychology studies much more than the mind or consciousness, as will be found as these pages are read further. It is not mind reading; it does not deal only with the mysterious and spooky things, although some of these are subjects for psychologists to study. Psychology, for instance, does not study spiritualism, although spiritualists may be fit subjects to study.

Professions and individuals that have turned to psychology for aid in the everyday routine of their affairs find it valuable, since **it deals with the actions or conduct of living organisms, espe-**

cially human beings. The advertiser wants to influence the conduct of those who read his advertisements, so that they will come into his store and purchase the articles advertised. The employment manager wants to know the capacities for various types of behavior of the candidates for positions, that each person may be placed in the position for which he is best suited psychologically. The evangelist wants to alter men's actions so they will "hit the sawdust trail," and change their daily actions for the better ever



FIG. 1.—A group of naval recruits taking a mental examination.

after. The teacher wants her pupils to acquire the most information in the most useful form in the best possible way.

Present day psychology is concerned with the way in which organisms react to their environment. That is why it has been found worth while for people, other than cut and dried psychologists, to know something about this field of science. We are all more or less interested in knowing how the other person will act under certain situations. We may want to know the most forceful way of presenting to our employer the plea that our working hours be altered. Our temporary happiness may depend upon

knowing how to get along with an exasperating neighbor or patient or practitioner. One wants to be able to gain the favor of a much admired one and manage his behavior so that a proposal is precipitated. Or it may be our foremost aim to educate the general public to a realization of the need for adequate preparation for the task of nursing, or the value of the practice of psychology by the medical person.

In all these situations one is dealing with the actions of human beings; it is attempted to control their conduct in channels acceptable to us, in other words, one is psychologizing—applying psychology—whether he has a really scientific background for so doing or not.

SELF-HELP FROM PSYCHOLOGY

One is not always concerned primarily with the actions of others; one's own actions from time to time are paramount in one's own interest. It may be a purely personal interest which leads one to the study of applied psychology. We may want to know the best way to memorize anatomical terms or the *materia medica*, or what to do when bothered by foolish, but none the less real fears and worries. Here again it is psychology which is being applied. It may be just a common sense sort of psychology with all its errors, or it may be a scientific psychology. That depends upon the preparation of the individual. In any event, it is psychology which will meet the need.

So it is apparent that anyone who is concerned with the behavior of human beings is interested spontaneously in a common sense sort of psychology. Nurses, especially, are engaged in a profession in which human behavior is an important factor. Of course they work with thermometers and medicines, with hot packs and spiral bandages. But human beings and their behavior also play an important rôle in medicine.

As far as the nurse is concerned the temperament of the patient may play as important a part as his temperature. The nurse should know the character of the patient as well as the

character of the pulse. It may not be a life and death matter, but it does have a great deal to do with the sick-room situation. As will be shown later, in reporting some case histories, the skill of the nurse or attending physician in applying psychology in the care of the patient does have a great influence upon the progress of the treatment in many instances.

The nurse finds herself from time to time in many an onerous situation in which she can profit by the use of certain applications of psychology. It may be the professional duty of seeing that the behavior of the depressed patient is not aggravated, and that the overt mental aspects of every case which comes under her care are approached in the proper manner. This does not imply that every case is a mental one, either actual or incipient. But it is a reflection of the self-evident and often expressed truth that there is a "**human factor**," as well as a pharmaceutical factor, in every patient.

Or, again, it may be a purely personal interest which prompts nurses to turn to a practical psychology for help. They, above all others, want to make use of the most efficient and healthy habits of work and thought; when on call day and night, hours of rest need to be properly arranged, they must know how to relax whenever the opportunity presents itself. There are relatives to be managed psychologically as well as the patient himself. There are the physicians and other nurses also, even they are not immune.

In short, it would appear that the practice of nursing would find the study of an appropriate psychology of great value and usefulness. It is far from being a cultural subject only; it is an intensely practical subject. Of course one can get along without it; our grandparents, or perhaps our parents, got along without motor cars and a system of air mail delivery. And perhaps they got through life in a manner very satisfactory to themselves and their times. They also had to do without aseptic surgery and antitoxins and skilled nursing. This was a distinct loss. Nurses, a generation ago, got along fairly well, for their times, without the use of psychology. A generation ago, psychology may have been a fanciful luxury; to-day it is an essential. It is a positive loss to do

without it in the sick-room; to-day it is essential in the armamentarium of the nurse.

The nursing profession is alive to these facts. A conscious attempt is being made by many of the profession to acquire a practical knowledge in the field of psychology. Articles of this nature are appearing with increasing frequency in medical and nursing journals; psychology is coming to be a popular topic for discussions at conventions and society meetings.



FIG. 2.—The examiner giving the naval recruits the "code test."

The trouble is not entirely with the nursing world failing to appreciate their need for training in psychology as well as pediatrics, ethics, anatomy, and physiology. The fault lies rather with the psychologists who, to date, have left the others to flounder around without aid in the great mass of psychological literature.

Other fields of applied psychology may bring in greater returns; there are more profits in advertising than in nursing. There is a need for an applied psychology in the sick-room, however, and perhaps it is more legitimate to apply psychology in the sick-room than across the counter or just above the dotted line.

PSYCHOLOGY AS AN APPLIED SCIENCE

Any science to be full-fledged and complete must be able to describe, control, predict, and explain phenomena which form a part of its subject matter. In an applied science, the chief interest lies in predicting and controlling certain phenomena. In applied psychology, for instance, one is desirous of **controlling the behavior** of others, largely through influencing their mental life in one way or another. The advertiser uses methods to modify the behavior of others so that, after reading his advertisements, they will change their plans and come to his store to make their purchases. He wants to control the buying part of their behavior. The impassioned champion of primitive justice harangues the mob until it is in a mental fury and bent upon a lynching. He has succeeded in controlling the behavior of a group of people.

In the sick-room there is also behavior to be controlled. There is the patient who refuses to take the required medicines; his behavior needs to be modified. Or there is another patient who refuses voluntarily to reinforce the involuntary parturient contractions. The final recourse need not be instruments or pituitrin, all other things being equal. If the nurse has been practising an applied psychology during the lying-in period, in most cases the patient will be coöperative when the second stage is reached. Then there are the sleepless patients who have the sedative habit. They may need a hypodermic injection of distilled water, or some placebo, or just a nurse who is capable of utilizing psychology during the normal waking hours. The psychological preparation of the patient for certain types of operations, as in exophthalmic goitre or Graves' disease, is practised by the leading surgeons and their nursing staffs specializing in this work. These examples are illustrative of the fact that there is need to regulate or control behavior as well as the diet. Anyone with nursing or hospital experience can add instance after instance in addition to those given.

An applied science also attempts to predict certain occurrences. The Weather Bureau predicts, with more or less success, the climatic conditions for the coming day or week. The physician always has the prognosis of a given case to consider.

PREDICTING BEHAVIOR

It is also possible to **predict the behavior** of an individual. If one is accosted on a dark night by a man with a handkerchief covering his face, who points a gun toward one's viscera, it is fairly easy to predict what will be the behavior of the accosted. He will do one of several possible things. He may turn on his heels and run with all his life, as well as for it; he may stand perspiring and paralyzed with fear; he may sob and plead with the highwayman to be merciful, since there is a family to be provided for; he may take it all as a great experience, or as the saying is, philosophically; or, in case the accosted is a woman, a prompt fainting is in order.

It might appear from this that predicting the behavior of human beings may be almost as precarious an affair as foretelling the weather. But such is not the case. In the example of the hold-up only part of the situation has been described so far. When one knows what has been called the mental make-up or the **past behavior history** of the person who is accosted, one can predict fairly accurately whether or not he will faint or argue with the rogue.

There were personal reasons for selecting this as an example which demonstrated the point which is being made. Late one evening several years ago an athletic friend came into my room.

"I was just stuck-up," he said.

He was rather nonchalant about it. But I knew enough about his past behavior history to know that it must be true. He was not given to exaggerating or fictionizing in his statements.

At the time I ventured a prediction. "You mean someone *tried* to rob you," I said.

He laughed, and drew out of his pocket the rascal's pistol. The prediction had been correct. And a few moments later he also casually drew a stiletto out of his coat pocket. This had been acquired in the same manner as the pistol. After removing his coat, he asked for some listerine and a roller bandage that he might dress his knuckles over night.

Now do not receive the mistaken impression that I did all this. I am merely relating an incident which shows that when the important facts of the past behavior history of an individual are known, it is possible to predict fairly accurately his present and future behavior. Concerning myself, I am sufficiently frank in going over my past behavior history to know what to predict about my behavior when I am accosted by a bandit. And at the same time, I hesitate to publish broadcast just what my conduct would be.

The main point to be remembered is that it is possible to predict behavior when one has available all the important factors with which to judge. The past experiences are indispensable for this, and it is usually in the past experiences in which individuals have their greatest differences.

STUDYING THE PATIENT

The nurse is seldom, if ever, in a position to know the past behavior of her patients or even her friends. That is why the nurse has all the greater need for some definite training in psychology. In most cases it is possible to diagnose, as it were, certain salient parts of the past behavior history of an individual. This is to be ascertained from what is erroneously called the "**mental make-up**" of the individual; it is given away to the trained observer through the **acquired reaction patterns**. A special training and special study is necessary if one is to become proficient in this aspect of applied psychology. One must study the reaction patterns of the patients scientifically, just as the pulse, temperature, and respiration are watched.

Where is one to find this training and study, available in an appropriate form? Most texts on applied psychology are not especially appropriate for the needs of the sick-room; the nurse needs a different emphasis than does the business man. It is one purpose of this book to provide this basis for study. It is incomplete, however, without daily observation on the part of the reader, as progress is made through its pages. *Human actions are everywhere observable; no elaborate laboratory equipment is needed.*

Read and observe! Understand your observations through more reading! Then practise!

There is one thing which needs special mention in this connection. The nurse has access to a unique and invaluable source of training in certain aspects of applied psychology. This is in connection with the state hospitals or private sanatoria for mental patients. Here one is enabled to observe certain types of behavior which have crystallized in extreme form. One sees there, in a clear cut condition, the manifestations of certain past behavior histories. Supplemented by the usual course of lectures and readings that are given in the better state hospitals, one is given a preparation for the use of a practical psychology in handling and understanding normal patients, as well as oneself.

In addition to this, one is given hourly practice in the control and prediction of behavior. If the affiliation work in the state hospital is entered into intelligently, one will come away a much better nurse. It is a question if the nurse can be considered adequately trained for the nursing of mentally normal patients if her training has been devoid of this special preparation and experience. It is probably no exaggeration to state, that the general nurse has more need for a special course in nervous and mental nursing than the mental nurse has for general medical and surgical nursing. And it is also a question if the medical practitioner may be considered well equipped for his practice if he is without psychiatric experience. The time is not far distant when most states will require this psychiatric training for nurses' registration, as well as courses in psychology, for graduation from accredited training schools. Massachusetts is now examining its candidates for medical licensure in the subject of psychiatry.

There is no mysterious difference between the workings of the behavior of an individual in health and disease. The bizarre notions of the mental patient are not due to a disturbed soul or the afflictions of a hypothetical mind. They are rather **disorders of behavior**, and are understandable largely in terms of the past behavior history of the individual. That is one reason why training with these patients is invaluable to the nurse. She is given the

opportunity to see certain behavior mechanisms under the magnifying glass of disorder. It is well for her to understand the essential behavior mechanisms if she wants to become proficient in predicting and controlling the behavior of mentally normal individuals.

In the chapters which follow, we will consider some of the features and peculiarities of the behavior of human beings, especially as they are of value to the understanding and management of the sick, the halt, and the lame.

TOPICS FOR DISCUSSION

1. Browse through the advertising pages of some popular magazines and report the advertisements which pertain to selling some psychological system for improving mental powers. Do these strike you as abusing the term psychology? Which ones do you think would be the first to cause the psychologist to throw his arms into the air in horror?

2. If psychology were limited to the study of the soul, would it be possible for it to become a science?

3. Psychology is not limited to the study of spooky things, but it does include some of them. Some of the spooky parts of psychology that are interesting to discuss are dreams, seeing ghosts, hearing voices from Heaven, hypnotism, and thought transference. Talk these over.

4. Recall some ward experiences in which the "human factor" has been very important.

5. In a standard work look up the mental changes brought about in exophthalmic goitre.

6. Look into your *past behavior history* and find instances in which some event in this past life of yours has made your mental reactions different from what they otherwise would have been. Have you ever suffered some fright that has caused you to fear certain types of dogs since the fright?

CHAPTER II

PSYCHOLOGY IN MEDICINE AND NURSING

What a Science is—Psychology as a Science—History of Psychology
—What the Sciences are—Reactions in Nature—Mental Diseases—
Psychology in Therapy—Psychology in Modern Medicine

MEDICINE is generally defined as the science of the treatment of disease, or the art of healing. Psychology is usually and modernly defined as the scientific study of mental life. One notices something in common between the modern definitions of psychology and of medicine, both subjects aim to be scientific. But, as a matter of fact, that is a tendency common to almost all branches of human interest. Just as the statesman will find the most laudable and lofty justifications for a bit of despicable political strategy, so the term science is usually honored by being dragged in by the ears in defining various studies. And let us see with what justification.

Science, so Gould tells us, is systematized and classified knowledge. This definition in its conciseness makes no mention of the knowledge having been gained through **exact observations**, and **verified** by more observations and experimentation. Unless this aspect is included, almost anything under the sun can be brought under the head of science. In considering the relations between psychology and medicine it is well to adhere to the more rigid definition of science; nothing can be too scientific for the treatment of disease.

It is usually accepted that medicine is a science. But, at the same time, one finds physicians conceding the point that it is also largely an art, especially in the practice of medicine. More recently certain national scientific bodies have given up the use of the term medicine in designating what were formerly the medical sections. Instead they are using the phrase *medical sciences*.¹

¹ These are the American Association for the Advancement of Science and the National Research Council.

IS PSYCHOLOGY A SCIENCE?

At the same time, one finds the **scientific status of psychology has been recognized for some time**. Just as the medical sciences have developed out of ancient superstitions and the pseudo-physiology of Galen, so there has also been a separation of psychology from the restraining bonds of mysticism and theology. The divorce between psychology and philosophy has been more recent than that between the medical sciences and philosophy. But in many respects this is to the advantage of psychology; it has reached a scientific status in an **age of empiricism** and has had the groundwork of the older sciences upon which to build. The branches which were attempted to be set up on an independent scientific basis earlier had the opposition of an unempirical age to overcome and but little scientific background for their development. So it is not at all surprising, in looking over the history of scientific physiology and scientific psychology, for example, to find more ludicrous and flatly absurd developments in the former. Since psychology may be counted a science, what is there in it that corresponds to Galen's "soul bone" in absurdity, or many decades later to the conception of the heart as a suction organ solely? But by-gones should be by-gones—except, perhaps, in case histories.

The scientific status of psychology, at present, is evidenced by its recognition as such by the National Research Council, the American Association for the Advancement of Science, the Society of Sigma Xi, and numerous other smaller and more localized scientific organizations.

HISTORY OF PSYCHOLOGY

Three principal stages may be noted in the development of present-day psychology. First, and longest, is the period during which the psychologizing was done by and with the aid of **philosophy**. Next was the beginning of separate **experimentation** when the evidence of the experiment came to be given more value than the opinion of the speculator. Like all developments, the evolution of the psychology of to-day has been by a gradual meta-

morphosis and not by a cataclysmic change in trends. Therefore it is difficult to mention an exact time at which opinion gave way to experiment. One finds that Aristotle performed minor experiments in psychology. But it is the general practice to set aside the year 1875 as marking the most significant event in the metamorphosis of psychology. It was in this year that Wilhelm Wundt, formerly a teacher of physiology in Heidelberg, took charge of the work in psychology at Leipzig and started the first laboratory devoted in the main to psychological investigations. This first university recognition of experimental psychology must not be looked upon as a new era suddenly turning over—rather is it the crystallization of tendencies which had been slowly and inevitably fermenting.

The more recent developments in psychology, as in most sciences, is towards the **practical application** of the empirical psychology to every-day life. The educator turns to the psychologist for information regarding the learning process and other factors involved in education. The advertiser is calling in the psychologist for assistance and advice that he may out-advertise his competitors. Trade tests are developed and marketed to be used in the selection of the best equipped candidates for positions involving special or general abilities. The psychologist was drafted into special work in determining the military fitness and adaptability of the mushroom army which was raised during the World War. More recent developments in the field of applied psychology are the organization of The Scott Company and The Psychological Corporation. This is by no means a complete catalogue; it is merely suggestive of the fact that, during recent years, the science of psychology has been found rich in contributions to the workaday world.

While this application of psychology is spectacular and enormous, it must not in any wise be confused with the entire field of the subject. Just as, back of the mechanical engineer, are the pure scientists working in chemistry, mathematics, and physics, so we find back of the human engineer a veritable army of cut and dried psychologists working hard at the innumerable research problems in **pure psychology**. The applied may be the more apparent, but it is at the little end of the horn. But at that, it is

mightily difficult to be a pure psychologist, for in real life it is impossible to separate psychology from one's daily activities.

So, the first things we find in common between modern psychology and experimental medicine is that they both may be properly classified as a science and both tend toward an art; both aim to be practical. We are in a period in which psychology is being directly and consciously applied to mundane existence. Since medicine and especially nursing, also deals in a way with human engineering, it is pertinent to ask if these cannot be "quickenened, revived, and enriched by team work with psychology" as one of their profession frankly states it.

But we cannot stop here; even the sciences are classified. All sciences have this in common: *They are concerned with the discovery of truths about Nature.* As knowledge has developed, it has become impossible for any single sort of observations to be adequate, so the natural outcome has been the development of the various sciences, with their slightly differing subject matter and points of contact with Nature.

WHAT THE SCIENCES ARE

The greatest division of the sciences is into the *abstract* and the *concrete*. The former are composed of the truths which hold for all specific facts; they include logic and mathematics. Two and two make four in chemistry as well as in physics and pharmacology. Certain logical errors are just as great errors in diagnosis as they are in botany or religion. It can be plainly seen why the one large division of the sciences is thus known as the abstract or **general sciences**.

Contrasted with these are the **special sciences**, which deal not with general and universal truths, but only with observed facts within a special phase of the manifestations of Nature. Physics and chemistry may be taken as examples of the concrete sciences, perhaps the basis upon which the others have to build. Another of the special sciences is biology, the study of living things, embracing within its subject matter botany, zoölogy, morphology, physiology and psychology.

It will be noted that the medical sciences are thus a part of the special sciences, and it will also be noted that, closely related to the commonly accepted medical sciences, anatomy and physiology, is the subject of psychology. Just what are the lines of demarcation between the members of this trio? Morphology (anatomy) studies the form and structure of living organisms, and includes histology, cytology, and embryology. Physiology deals with the physico-chemical processes characteristic of the vital activities of the living organism; it attempts to reduce all life processes to terms of physics and chemistry.

Psychology deals primarily with the interrelations between the living organism and its environment; it is interested in the reactions which the organism as a whole, and as a living organism, makes to certain parts of its surroundings. This reaction may be dodging a missile, or the packing of a travelling bag in response to a telegram. The reaction may give rise to a more complex type of behavior and result in reasoning out the law of gravitation as when an apple falls on a Newton.

Thus, it becomes apparent that there is a wide divergence of aims and interests in this group from the biological sciences. Still there is much **interdependence**. Physiology (function) is inseparable from anatomy (structure) in many instances. And Psychology (behavior) is oftentimes interlaced intimately with physiology. But that does not by any means signify that, when a person has mastered anatomy he is also a physiologist; or when physiology is mastered he also qualifies as a psychologist. Such is far from being the case. One may study anatomy, physics, and chemistry until doomsday and still know about as much physiology as the typical Fiji Islander. Physiology is much more than elements, forces and structures. Neither is it a summation of a little from physics, some chemistry, and a smattering of anatomy; it is a distinct field for study and research.

The same is true with psychology. One can be fed up on physiology, Einstein, Aristotle, and Loeb, and be about as far removed from being a psychologist as is H. G. Wells. Like physiology, psychology is a distinct field for study and research. Mastery

of the form and function of the nervous system and endocrinology does not *ipso facto* qualify one as a psychologist; this is a splendid start, but is still far removed from the goal. Psychology has accumulated a vast amount of special information, which is neither anatomy nor neurology, philosophy nor physiology. Much of this special information is such as to be of great service to the nurse in caring for her patients. And it is not to be absorbed from the usual sequence of medical sciences and clinical studies.

REACTIONS IN NATURE

The distinctness of subject matter will perhaps be made clearer by following Dr. William A. White in citing examples of the various levels of reaction in the world of nature. Probably the simplest type of reaction is the **physical reaction**. The seed blown by the wind and the water plant, whose branches are set into graceful curves by the flowing stream, are examples of this type of reaction. It frequently befalls Man to make reactions of this type, as, for example, when one stumbles and falls over inertly. So long as no attempt is made by the organism to prevent the fall or to soften the landing, the reaction is nothing more than a simple physical reaction.

We may be granted the right of placing next in order the **chemical reactions**, such as take place in digestion and metabolism. But even here it is difficult, perhaps impossible, to single out organic reactions that are purely chemical. They are almost invariably associated with physical reactions as well. The processes of metabolism in the cells, for example, are inseparably dependent upon the permeability of the cell membranes, and permeability is largely a matter of physical reactions.

With the advent of nervous pathways, which enabled one part of the organism to be brought into functional connection with remoter parts, another type of reaction came into existence. This new type of reaction was made imperative by the increased size and complexity of the organisms, which had reached a point in their development such that they could no longer be served by the simple physico-chemical reactions. This new type of reaction was

characterized by a definite stimulus, coming to be associated with a certain definite response. This marks the formation of **sensory-motor reactions**.

Further competition between living organisms and further increases in size and complexity of structure came to give the advantage to that animal which reacted to the present situation in the light of what had been done in previous and similar situations. At this level and above, there are the reactions which have been more or less erroneously called mental, psychical, intelligent, and even spiritual. In these instances, the reactions are not simple sensory-motor responses; they are modified by the past reactions and evidences of memory, habits, purposive reactions, and emotional reactions begin to appear. These are at the level of the true **psychological reactions**.

When a study is made of the reactions of falling bodies, it is properly a study in physical reactions. A study of the function of the gastric juices in protein metabolism is a physiological study at the physico-chemical level. A study of the variations of the patellar reflex is properly a functional study of sensory-motor reactions, and as such is a physiological study. An investigation into the most effective means of memorizing anatomical minutiae, the acquisition of skill in surgical technic, the management of a habit case, or allaying the patient's fears, are concerned with reactions at the psychological level.

It should become apparent from these considerations that one does not qualify as a psychologist, or have a very serviceable body of information about the subject, even though reams of anatomy, physiology, materia medica, therapy, and diagnosis be absorbed. From the point of view of content, then, the relationship between psychology and medicine (or the medical sciences) is clearly distinct.

MENTAL DISEASES

Immediately the question arises regarding any other relations between these subjects. Let us now devote some attention to the matter of any further relations. There are numerous terms in common medical usage which incorporate the root *psyché*, mind.

These would presage some relationship between psychology and medicine although, as we have found, there is a vast chasm separating their general subject matter.

Of these terms two may be signalled out as being especially pertinent in the present discussion. The one term is **psychiatry**, "the science and treatment of diseases of the mind." Here one properly finds the physician dealing with abnormalities, with diseases. But this is a very special field, which lies somewhat on the



FIG. 3.—The Psychological Laboratory in McClean Hospital, Waverly Mass. This is the oldest laboratory of the sort in a hospital for mental patients.

borderline between psychology and medicine. From time to time it is rather difficult to know toward which side it belongs more fully. It deals with the mental life, with failures in the reactions at the psychological level. Thus it is not surprising to find, early in the care of mental patients, that psychological laboratories were established as an integral part of the institutions leading in this field.

Psychiatry also deals with diseased conditions and not infrequently with demonstrable organic lesions. So it properly belongs also to medicine. But psychiatry is as foreign to the legitimate practice of the medical person untrained in psychology as it is from the probings of the psychologist devoid of medical training. The

specialist in diseases of the heart, who is not a charlatan, has spent a great amount of time studying the anatomical and physiological features of normal cardiac muscle, the arrangement and function of its valves, and the general circulatory systems must be studied intensively. The practitioner who is not a specialist must also understand the normal heart. Can the same person intelligently deal with mental disorders, when only the disorders have been studied? The answer is so plain it need not be stated.

This relationship may perhaps be clarified by recalling that it is coming to be generally recognized by the leading psychiatrists that in many, if not all, cases of mental disease, there is present only an exaggeration of certain normal psychological reactions. There is no foreign "disease entity" that takes hold of the reactions at the psychological level nor an entelektical bacillus infiltrating into the nerve centres that produces the abnormal psychological reactions. So it becomes all the more imperative that the physician should be trained in the appropriate psychological approach to the mental patient. Furthermore, it is rather embarrassing to the physician when a person psychologically trained, but innocent of any medical preparation, takes the reins in a mental case, with results several-fold more successful than the orthodox practitioner had obtained.

As a matter of fact, psychiatry itself is a subject usually crowded out of the medical curriculum, so there could be little hope of including a preparation in psychology. Only one state in the Union, and that only recently,¹ has begun to examine its candidates for licensure in psychiatry. So, there is little to wonder at when one reads that each year 60,000 persons in the states leave their hearths to enter the already overcrowded state hospitals for mental patients.

PSYCHOLOGY IN THERAPY

Another long recognized relationship between psychology and medicine is brought down in the term **psychotherapy**. This is the treatment of disease by mental influences. Psychotherapeutics has

¹ Massachusetts.

passed through a long and interesting history and, at present, is consciously used but little by the medical profession. At numerous periods in its development it has smacked of charlatanism, but many sincere attempts by reputable physicians have been made to develop it. In the nineteenth century, especially, hypnotism was extensively used, and although its development as a therapeutic aide was greatly hampered by uneducated fakirs on the one hand, and ultra-materialistic scientists, on the other, still, much was accomplished in forwarding the investigations of the relation of hypnotism to therapy.

Perhaps the most notable occurrence in this development was the appearance of Bernheim's work on "Suggestive Therapeutics." Therein he reported numerous successes with this method; most of his patients, however, appear to have had the little aches, pains and troubles characteristic of what are now commonly known as hysterical affectations. But the same method, namely hypnotism, was frequently used before the development of anæsthetics to produce surgical analgesia. To-day, very little popular credence is held in hypnotism, and it smacks of the variety rather than of verity.

At the present time, most of the psychotherapy is accomplished outside of medical ranks, the **faith healer** and the **occultist** swelling the rising army of the **drugless healers**. The surprising thing is, that they really accomplish results. But is it really surprising? Numerous so-called nervous symptoms yield more readily to **persuasion** or simple conversation than to bromides and cathartics.

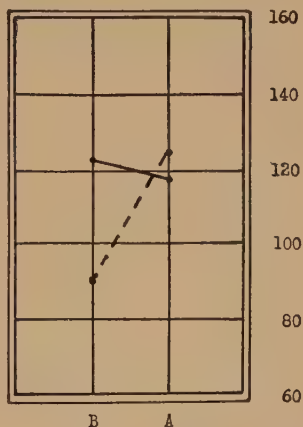


FIG. 4.—Pulse chart (B) before operation, (A) after operation. The solid line shows the pulse rate of the patient, the broken line the pulse rate of her sister. The strain of watching the operation was greater than the actual strain of the operation so far as the pulse rate is concerned. Courtesy Lakeside Publishing Co., New York.

Then, too, many of the **self-limited diseases** pass on when they have run their courses; if the regular physician is in attendance, internal medicine receives the credit; if an occultist is giving absent treatment, he receives the credit. A cure under the usual clinical conditions means but little in the matter of logical conclusiveness. At most it is only inferential knowledge that is gained. The significance of the mode of therapy used is still less for logical purposes in the neurotic and self-limited diseases. Nicely controlled clinical observations, however, show how readily the ailments of the hypochondriacal invalid, which had been unameliorated by the orthodox practitioner, give way under the proper psychological approach.

The treatment of disease by mental influences, however, is by no means limited to hypnotism and suggestion. The more recent work of Cannon, Crile, and Kempf is bringing to the light of scientific investigation a relation much more definite and significant between the psychological reactions and the physico-chemical reactions of metabolism than was ever anticipated by the old philosopher who rambled along on the subject of the relations between "mind and body." Especially is this true in the case of the emotionally-toned psychological reactions. We will take this up in detail in the chapter on Temperament.

So much, then, for the therapeutic relations between psychology and medicine.

PSYCHOLOGY IN MODERN MEDICINE

Turning now to another relationship existing between these subjects, we will first consider the aims of modern medicine. Narrowly considered, medicine aims to treat, cure, or relieve disease and suffering. Broadly considered, however, the physician is dealing with **sick individuals** and not merely disease entities. It is with the patient, rather than with the disease, that the physician should manifest more solicitude. Medicine cannot be dehumanized.

Especially is this true of the work of the nurse. There is more to orthopædic surgery than the straightening of deformed joints. That is a wonderful accomplishment in itself ; but it is of little use to the patient, unless he is taught the effective means of using his remodelled equipment and is given the proper outlook onto life to foreguard against any social imbalance through feelings of inferiority.

Occupational therapy has long been in use, but its most extensive utilization has been in dealing with the numerous war disabilities. The most successful occupational therapy has been found to be that in which the simple limb and joint movements are above the sensory-motor level of reaction, and are supplemented by motivation and psychological supervision. Here is a case where the physician must to date call in the trained psychologist, not as an aid, but as an independent officer. Diversional therapy is not simply to kill already dead time which hangs heavily on the patient's hands. Neither is it limited to the physical exercise and joint articulation obtained. The rehabilitation of the patient as an individual, and not merely as a successful operative case, is the end in view. The use of the term "*hospitalization*" with respect to human beings is one of the most powerful indictments that the physician and nurse have failed in their dealings with the patient at the psychological level.

The extensive development and use of the laboratory diagnosis and serum treatment in medicine has served to obscure on the surface the human factor involved. The newer diagnostic methods force the physician's attention upon organs and tissues, and cloud over the effects which the disease might have upon the patient's personality. As Dr. Adolf Meyer has said, "The missing chapter in ordinary physiology and pathology, the chapter dealing with the functions of the total person, and not merely detachable parts" is one sorely in need of perusal by the physician. Some psychologists think this is exactly the criterion distinguishing psychology from physiology, *i.e.*, psychology is the *chapter missing*.

“ We treat the stomach, the lungs and the heart
As if these three things were set apart;
We treat the kidney, the liver and feet,
And all the while ourselves we cheat.
We sneer at our brother (I beg pardon please),
And haply think we are treating disease.
We work along the well-trodden plan,
And somehow forget we are treating a man.”

Modern medicine is coming more and more to emphasize its social bearings. Perhaps its two greatest achievements in this direction are the development of **preventive medicine** and the increasing tendencies away from the **hospitalization** of the patient. In the second of these aims we have already found psychology the *sine qua non* of really successful rehabilitation. In the prevention of disease, also, psychological factors are prominent in every educational campaign or attempt at propaganda. The physician of today must either largely trust to luck in these respects or call in an outsider for aid. As medicine is gradually and properly becoming more of a social science, it is also becoming all the more imperative that, if all around success is to be reached, preparation is essential in the study at the base of the social sciences,—psychology.

In this book there will be presented, in the main, only a small fraction of the field that represents the relation of psychology and medicine. Psychiatry and psychotherapy will be mentioned only as they shed light on the more practical problems of understanding the mental life and activities of the patient and ourselves. And not merely how to understand mental activities sympathetically and intelligently, but also how to mould them as we wish. The essentials of the control and prediction of human behavior is our goal. To reach this, it becomes necessary to turn to a brief study of behavior in its biological aspects. This is the scope of Part Two.

TOPICS FOR DISCUSSION

1. In which does art enter more, making a Wassermann test or diagnosing and treating pulmonary tuberculosis?
2. Household remedies are a part of the development of modern medicine. Can you find certain psychological practices that represent a similar stage in the development of psychology, such, for instance, as thinking that the boy who argues will make a good lawyer or that one's disposition depends upon the position of the planets when he was born, or that blondes are fickle while brunettes are faithful?
3. Which of the following are physical, chemical, sensory-motor, or psychological reactions:
 - (a) heating a hypo tablet in water to hasten dissolving?
 - (b) the contraction of the pupil when a bright light is flashed into the eye?
 - (c) thinking eight when you hear some one say "two times four"?
 - (d) the action of the saliva on foods?
 - (e) the forcing of the food down the œsophagus?
 - (f) becoming angry when reprimanded?
 - (g) sneezing when tickled under the nose?
4. Is the physician or the psychologist more interested in the brain cell changes in cases of mental disorder? In why the mental patient thinks that it is his mother rather than his wife who is poisoning his food?
5. Recall instances in which a physician has used suggestion by telling the patient that after half of the medicine is taken he will feel much better.
6. How would you scientifically account for the cures of modern "faith healers"?
7. If the patient just has the idea that he is ill, will cutting out the appendix or ovary remove the idea?
8. Have you ever noticed a rise in temperatures on visitors' day?

PART II
FOUNDATIONS

CHAPTER III

THE BIOLOGICAL FOUNDATIONS OF BEHAVIOR

The Changing Emphasis in Psychology—The Psychology of a Drop of Protoplasm—The Behavior of an Amœba—Likeness between Man and an Amœba—The Role of Nerve Tissues

SCARCELY more than a century ago it was thought that the only proper way to understand the mental life and behavior of human beings was by the aid of theology. But, as the following chapters will show, the thyroid gland and intestinal tract have been found to have more to do with the behavior of men than do their souls. It is appropriate at this point to take up certain organic and physiological substrata of human behavior.

Psychology studies the relationships which exist between the animal and its environment. It is more interested in the organisms than in the environment, however. It is interested in the way in which animals, especially the human animal, are affected by certain changes or conditions in their environment, and the way they react to these parts of their environment.

When a juicy bone is taken away from the dog he snaps and growls; when typesetting machines were invented the journeymen printers raised a great hubbub of protest. In both cases, the food supply of the organism was threatened; the organisms reacted in somewhat different, but still, very similar, ways. Or the relationship may be simply a lowering of the temperature, which causes the bear to hibernate in his winter quarters and causes Man to don woolen underwear.

The basis for the complex behavior of Man is to be found in the varied relations which exist between organisms and their environment. It is essential that one have a clear understanding of this biological basis of behavior before attempting to control and predict the behavior of human beings as an applied psychology.

THE PSYCHOLOGY OF A DROP OF PROTOPLASM

It is well to start our survey of the biological basis of behavior with a short study of a group of single-celled animals known as the *amœbæ*. These animals are little more than a microscopic drop of living protoplasm. The entire animal consists of only a single cell and they, therefore, belong to the **protozoa**, as do all single-celled animals. Animals composed of more than a single cell belong to the **metazoa**. It is quite probable that ordinarily, one never sees these single-celled animals except under the microscope. But they are important for us at present, since they may be made a subject

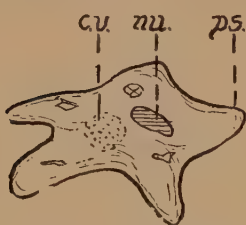


FIG. 5.—An *amœba*. *nu.*, nucleus. *c. v.*, contractile vacuole. *ps.*, pseudopodium or false foot. The other structures are food particles which are being digested.

of psychological study. They have certain types of behavior, and in such a fairly simple form that they will furnish a basis for understanding the more complex behavior of Man in many respects.

The *amœbæ* have no definite shape. They are just shapeless masses of **protoplasm**, semi-fluid in nature. They live in water and can usually be found at the bottom of a rather stagnant pool, where they feed on the decaying vegetable matter and, occasionally, others of their kind. Very seldom is an amoeba spherical in shape. As a general rule, their outline is very irregular. Numerous false-feet or *pseudopodia* are projected from the central mass of protoplasm. These are the organs of locomotion which propel the animal whither it will. There is nothing definite about the structure and arrangement of the pseudopodia. They are continually being withdrawn and reformed in an active amoeba. Their shape is constantly changing.

Within the animal certain characteristic structures are to be discerned. First of all, it is apparent that the cell protoplasm is not clear and evenly transparent. The inner parts of the protoplasm are filled with granular structures, which are made up of particles of food; debris, and a larger apparently spherical and fairly clear structure, which changes in size when observed in a

resting animal. This latter is the *contractile vacuole*. When observed in an undisturbed amœba this vacuole gradually enlarges, and then as gradually diminishes in size, and repeats this procedure indefinitely. It is for this reason that it is known as the contractile vacuole. One more important structure is to be noted in the amœba. As a typical cell it is only to be expected that the *nucleus* would be observable. This is usually present as a round or ovoid body among the food granules, but distinguishable from them by its greater size and increased density.

THE BEHAVIOR OF AN AMCEBA

It is the behavior rather than the structure of the amœbæ which will be of most value in the present connection. Several vital functions and activities are present in this mass of undifferentiated protoplasm. First of all the amœba absorbs food particles from its environment and assimilates them into

its living protoplasm. In other words **metabolism** is taking place. Consequent upon this metabolism of food and its conversion into energy, is the growth of the amœba.

The second important feature of the life of these single-celled organisms is that of **reproduction**. Metabolism preserves the individual amœba. Reproduction preserves the race. Reproduction takes place very simply in the amœbæ. Certain of them are observed to divide gradually, so that half of the nucleus, and approximately half of the protoplasm, separates to form two new individuals. These are termed the daughter cells. So far as has been observed, all the essential steps in this form of reproduction, which is **binary fission**, take place within the individual amœba. Thus the amœbæ reproduce themselves without any outside aid

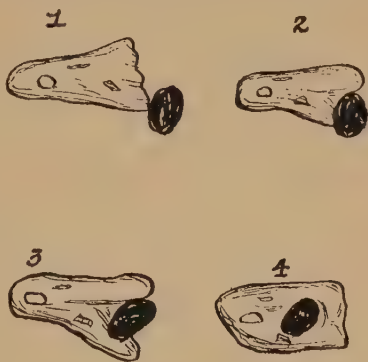


FIG. 6.—Drawings illustrating the response of an amœba to suitable food material. Successive stages in enveloping the food are shown.

other than food, just as metabolism takes place without the necessity of the food substances being cooked or prepared in any way. They are not even ground between the teeth, for the amoeba is obviously as innocent of these as is a new-born babe or a centenarian.

Next is to be distinguished the fact that the amoebæ are **sensitive** to certain forces in their environment. When one side of an amoeba is heated with the point of a hot pin, the animal moves away from the increased temperature. Certain features of the environment apparently irritate or stimulate the animal into activity. This is because sensitivity is one of the vital properties of all living protoplasms. The amoebæ are stimulated by chemicals, as well as by changes in temperature, or what are termed thermal stimuli. Ordinary table salt serves as a chemical stimulus to activity in the amoeba. How the amoeba reacts to a stimulus of this sort is shown in Fig. 7.

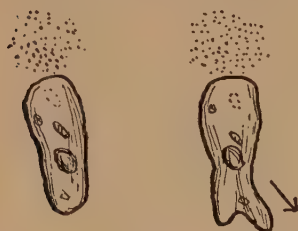


FIG. 7.—Behavior of an amoeba when stimulated by ordinary table salt. The amoeba drawn at the left was resting and motionless. The dots indicate the grains of table salt dropped into the water. The drawing to the right shows the amoeba starting to move away in the direction indicated by the arrow.

Light is also a stimulus to which the amoebæ are sensitive. In general, a light stimulus interferes with the activities of these animals. It is interesting to note, however, that red light has no effect at all upon the amoebæ. This may be roughly compared to color-blindness in human beings. Mechanical stimulation with a probe also arouses the amoebæ to activity.

One of the most common responses which is made by the amoebæ to stimulation is that of **contraction**, followed by movements away from some stimuli or toward others. The contractile vacuole is constantly contracting and expanding. So the property of contraction may be included in our list of significant features in the daily behavior of these animals.

Perhaps the most significant for our purposes, however, is the fact that, when stimulated at one part, the animal responds by moving another part. For example, when a mechanical stimulus is

applied to an amœba it is not always the part in contact with the stimulus which responds first. This is illustrated in Fig. 8. Here it will be noted that the movement away from the stimulus is begun by the end of the animal opposite to the end stimulated. This means that **conduction** is taking place.

LIKENESS BETWEEN MAN AND AN AMŒBA

Turning our attention now to the higher animals, such as Man, we find that practically all the body cells possess each of these five functions characteristic of living protoplasm, in addition to some which we have not taken up here. It is to be emphasized, however, that practically all cells contain the functions which we have found in the amœbæ. In some cells, and this is the important point, certain of these functions are increased above the others. **Specialization of function** is one of the features of the organs in the higher animals, but over and above this specialization of function one finds all cells possessing certain functions in common.



FIG. 8.—When an amœba moving in the direction indicated by the heavy arrow is stopped by a blunt point, a pseudopodium is formed at the opposite end. The remainder of the organism then follows in the direction indicated by the broken arrow.

Metabolism is a characteristic of all cells of animal tissue. In the amœbæ the food particles are digested and assimilated within a single cell. In Man, certain cells are set aside as organs for breaking down the food substance into its elements in the digestive tract. Thus, a predigested food supply is sent to the muscle and gland cells for them to assimilate. All the body cells, however, are active in converting food into body structure and reserve energy to use in accomplishing work.

Reproduction is usually thought of in Man as being associated with certain body cells. Practically all cells have the power to reproduce themselves under favorable conditions. When one's finger is bruised and skin is lost, it will be replaced by neighboring cells reproducing themselves in such a way as to cover the bared

place in a short time. In general, though, reproduction is much more localized than is metabolism.

Contraction is also more or less characteristic of all living cells. In the higher animals, this function is found in its greatest development in the muscle cells. In these cells, their chief task in preserving the body economy is that of contraction. All cells are also irritable or sensitive; the muscle cells do not contract indiscriminately, but only when aroused by a certain definite stimulus, which is usually given by the nervous system. Certain stimuli irritate the digestive glands to secretion.

THE RÔLE OF NERVE TISSUES

The tissues of the body in which irritability is most marked are the nerve tissues. **Sensitivity** and **conductivity** are the special functions highly developed in the nerve cells. As animal organisms increased in size, it became necessary for certain parts to serve as conductors to bring different parts into communication, as it were. Changes or stimulation in one part of the body are thus quickly brought to effect changes in another part. A man with a well functioning nervous system may be walking down the street when he sees a banana peeling in his path. The nerve tissues bring the highly sensitive part (the eye in this case) into touch with other parts (the leg muscles). Thus, he walks around the treacherous skin or perhaps kicks it into the gutter. If there had been no nervous system active in stimulation to sense this peeling, and no nervous system active in conduction to convey this information to other parts of the body, this man we are considering would probably have provided amusement for all the bystanders, when he stepped on the banana skin, which is no respecter of persons.

The amoebæ have no need for tissues specialized in these two functions. They are such small organisms that, even without a specialized conductivity, one part soon comes to be affected by stimuli applied at other parts of the body. In Man, however, this is not the case. Conductivity would take place only very slowly, and in an unorganized manner, without the aid of the nerve tissues.

In Man, it is the nerve structures which are the prime controllers and organizers of his activities. To understand Man we must understand his nervous system and how it works; but we can get a better understanding of Man through a survey of the place and development of the nervous control of behavior in other animals.

TOPICS FOR DISCUSSION

1. If some dry grass or hay is placed in a glass of water and kept in a warm place for several days, it will soon be found to be swarming with amœbæ. These can easily be seen under the low power of the microscope by merely placing a drop of the infusion on a glass slide. They are interesting animals to watch.
2. When the eye of a crab is amputated a new one sometimes grows on the stump of the eye-stalk. Why is it that in the case of men a new finger does not grow when one is amputated? Skin, muscle, and bone cells will reproduce. Why do they not grow a new finger?
3. Does reproduction take place in human nerve cells after birth?
4. When a part of the brain is lost by accident, does it grow back after the fashion of the skin growing over a wound?
5. Which is specialized more in sensitivity, in conductivity: the sciatic nerve, the retina of the eye?
6. Does metabolism take place in nerve tissues?
7. Is specialization in function accompanied by a compensatory loss or diminution of other functions?

CHAPTER IV

MAN AND BEAST

Versatility—The Psychology of a Sponge—The Psychology of a Sea-anemone—A Practical Joke on a Sea-anemone—The Essentials of a Complete Nervous System—Man's Versatility—The Senses of Animals—Learning in Man and Beast.

IF one were asked to sum up in a single word the essential difference between Man and the lower animals that word would be **versatility**. Man's behavior is subject to change and improvement; he may be trained in the performance of new tasks, he may be educated. The lower animals are able to modify their reactions but little. Even the animals closest to Man in the scale of life are hopelessly inferior to him in their capacities to learn new forms of reaction or to modify their behavior.

In Man, the variety of possible adaptations is made possible, largely, by the highly developed and organized nervous system, which exercises control over his actions. Muscular arrangement and osseous leverage play an important part, of course. But in Man, these muscles and bones are controlled, in the main, by various parts of the nervous system. It is very important for the adequate understanding of human behavior, however, to know that behavior is possible without any demonstrable nervous control, both in Man and in the lower animals.

Irritability is a common property of all living organic matter, both plant and animal. This characteristic of living protoplasm has its basis in the unstable molecular structure of organic matter in the living cells. This property of irritability provides the basis for behavior. In its simplest forms, behavior is an **organized irritability** to certain environmental forces, such as contracting in the cold or reacting to a beam of light. In its higher forms, behavior is not so uniformly organized; the same environment does not

always bring about the same reactions and perhaps does not bring about the reaction until after some time has elapsed. The simpler forms of behavior, which consist in the immediate adjustment to changes in the surroundings without the intervention of nerve structures, are spoken of as **tropisms**. The behavior of the *amœbæ* is typically tropic.

Tropic behavior is present in plants, as well as in the simple single-celled animals and in Man himself. Certain of the familiar house plants turn their open flowers toward the source of light. Among the single-celled animals we find that the *Euglenæ* invariably seek the light. The tropisms are directly adaptive in their service to the organism. Thus in the *Euglenæ*, as in all protozoans, certain **negative tropisms** keep the organism away from noxious chemical influences. Other tropisms, which are known as **positive**, impel these microscopic animals into contact with other chemical particles which will serve as food material.

These lowly protozoans are devoid of all nervous structures in the morphological sense of the term. But still, we find them living a rather rational existence, as it were. They are selective in their tropisms, being stimulated positively by certain forces in the environment, and reacting negatively to other forces. Normal protozoans are not subject to the vicissitudes of appetite, as is Man, but uniformly accept or reject food particles. A rather monotonous existence which these tiny single-celled animals live, but withal, a very well regulated life.

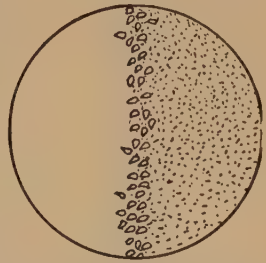


FIG. 9.—Tropic behavior in *Euglena*. The left half of the field was lighted, the right half shaded. The *Euglena* seek the intermediate region. These are small, single-celled animals with no nervous tissues.

THE PSYCHOLOGY OF A SPONGE

Among the lowest multicellular animals we also find this machine-like behavior characteristic of tropisms. Differentiation of the cells and their function is taking place in these primitive

metazoans, but still among the lowest—as in the sponges—no nervous tissue has yet been discovered.

The chief activity of the sponges consists in causing a flow of water through the central cavity of the animal. This water enters through the numerous lateral pores found along the sides of the animal. It is these pores which give the living animal the porous structure, characteristic of the ordinary sponge purchased in the drug store. Numerous flagellated cells, the choanocysts, located in these lateral pores and around the central

cavity, produce a flow of water through the lateral pores, into the central cavity, and finally out at the apex through the mouth-like osculum. These flagellated cells lash their whip-like processes continuously, keeping up a steady flow of sea water through the porous system of the sponge.

Although the sponges are free from any nervous structures, they do have some **primitive muscle cells**. These cells, in which the function of contractility is coming to be developed to

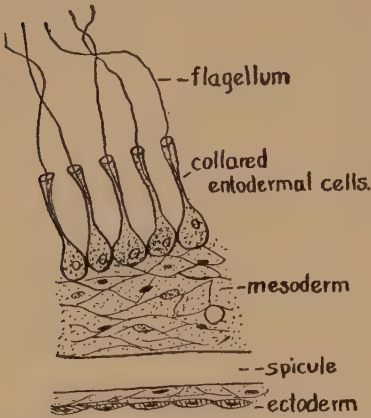


FIG. 10.—A cross section of a marine sponge seen under the microscope. No traces of nervous tissues are seen. (After Shull.)

greatest prominence are known as the myocytes. These specialized contractile cells are situated as ringlike structures around the pores and osculum of the sponge.

Now if the inner surface of one of the lateral pores or the osculum is punctured by a needle, these primitive muscle cells contract, closing the pores of the body wall with remarkable quickness for so sluggish an animal.

Thus we find in the sponge an extremely simple yet effective and rather specialized mechanism, which is able to perform its functions independently of any nervous system. **Effectors, or organs of response** in the form of contractile tissues, are thus

found to precede the nervous structures in their appearance in the animal kingdom.

This same rudimentary condition of functional independence of muscle cells is found also in certain muscles in Man. The **sphincter pupillæ** muscle in the human eye has this characteristic. When all neural connections with this muscle are removed, the muscle will still contract when stimulated even by a small amount of light. The **heart muscle** of vertebrate embryos also begins active functioning before any neural connections have been established with it by the rapidly developing nervous system.

The first step in the development of complex behavior in the animal kingdom was the formation of muscles (effectors) out of the unspecialized cells of the lowest animals. These effectors were also able to perform their functions **without any nerve control** at all.

THE PSYCHOLOGY OF A SEA ANEMONE

The *coelenterates* are a group of animals higher in the animal scale than are the sponges. Their structure is more complex and their behavior is also increased in complexity. These animals, of which the sea anemone and the jelly fish are typical, have distributed throughout their outer portions (ectoderm) specialized cells in which the property of irritability is most prominent. These cells are the beginnings of nerve tissues, and are called **receptors**, since they are especially receptive to changes in the outer portions of the organism which they serve. Due to the presence of these special receptive cells, one is not at all surprised to find the sea anemone responsive to external stimulation. Simple mechanical stimulation, such as pricking with a needle, causes an immediate contraction of the entire animal.

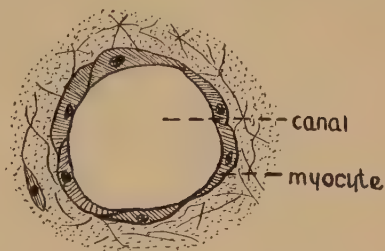


FIG. 11.—Cross section of the canal of a sponge, highly magnified. Note the primitive muscle cells, the myocytes. These are present in this animal in which no nervous structures are found.

These receptive cells, as shown in Fig. 13, have processes which bring them into direct contact with the muscle cells of the sea anemone. Stimulation of the primitive sensory cells (receptors) causes a contraction of the muscle cells (effectors). The behavior of these animals is thus seen to be under the control of a rather simple mechanism which is called an **effector-receptor system**.



FIG. 12.—Drawing of a sea-anemone fastened to the mud underneath water. The fingerlike tentacles carry food particles toward the mouth opening in the center.

Although this system of the sea anemone is a great advance over the simple *effector system* of the sponge, it is still somewhat crude in its working. As a rule, stimulation of just one part of the surface of the anemone brings about a general movement in the entire animal. The irritability is carried, apparently in all directions, through the layer of nervous network, each nerve fibre in the nervous layer being fused with those others whose paths it crosses.

This is the nerve net type of connection and is responsible in a large measure for the general response which is brought about by some stimulations.

In the face of this diffuse distribution of the nervous control of the sea anemone, there is still some specialization taking place in the primitive sensory cells themselves. The cells located around the mouth and lips of the animal are sensitive only to the contact of food particles. Ordinary mechanical stimulation has no effect upon them. The sensory cells of the other portions of the ectoderm are sensitive to mechanical stimuli, but not to ordinary food particles.

The sea anemone has nothing that corresponds, even remotely, to a brain. Anatomically, the primitive nervous layer forms a continuous system in which the cell processes are fused into a network. This **nerve net** lies in direct contact with the muscle fibres and stimulates them to action directly and in a diffuse manner.

A PRACTICAL JOKE ON A SEA ANEMONE

The behavior of the sea anemone is also such as to lead to the conclusion that its nervous organization is diffuse and unspecialized. For example, if bits of meat and pieces of blotting paper, soaked in meat extracts, are placed alternately on the tentacle of one of these cœlenterates these morsels of food will be carried to the mouth without hesitation. The

sea anemone, at first, does not discriminate any difference. After several repetitions of this deception, however, the animal becomes aware, as it were, of the trick which is being played. After a dozen or more feed-

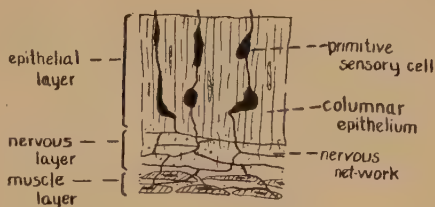


FIG. 13.—Diagram of the ectoderm of the sea-anemone showing its simple effector-receptor system for controlling its behavior.

ings on the meat and the meat-soaked blotting paper, it will begin rejecting the camouflaged food morsels, while meat is still greedily accepted by the tentacles and carried to the mouth of the animal.

But here is where the behavior of this animal indicates no central nervous organ, such as a brain or spinal cord. After one group of tentacles has been educated, so to speak, to distinguish the real from the spurious food, the experiment can be performed with another group of tentacles which have not yet been used in the experiment, when this is done, it is found that these tentacles unhesitatingly accept both the meat and the paper and convey them to the mouth of the animal. There is thus no **profiting by the experience** of the other tentacles, as would be observed if there was any centralization of the nerve tissues into controlling centres.

Parallel, if not identical structures of a diffuse nerve net type are found in certain portions of the human nervous system. These parts of the human nervous system have been found of late years to be a very important factor indeed in human behavior, so sig-

nificant, in fact that they will be given a separate treatment in the following chapters.

For the present it may be stated that the most typical nerve net construction in Man is found in the nerve supply to **the wall of the intestines**. There minor plexi from the autonomic nervous system come into *immediate contact* with the layers of contractile tissues. It was thought for some time that the movements of the intestinal walls in churning the food and in peristalsis, were under the control of the splanchnic nerves, which connect with the spinal cord. Experimentation has demonstrated, however, that when these nerves from the central nervous system are completely removed from all contact with the intestinal walls, its behavior remains much the same as before. In Man, also, we thus find that this primitive type of effector-receptor system is present in certain portions of the autonomic nervous structures and is capable of working without any control from the central nervous system.

ESSENTIALS OF A COMPLETE NERVOUS SYSTEM

Above the coelenterates in the animal kingdom the **intermediary** or what are sometimes known as the **associational neurones** make their first appearance. The diffuse nerve net type of structure remains in parts of the organisms, but the greater part of the nerve tissues are not of this type of construction. In this latter type of nerve structure the processes of the individual nerve cells do not fuse, but retain their identity to a large extent. This absence of diffuseness makes for quickness in conduction. Certain neurones have also appeared, which connect to the muscle and are known as **motor neurones**. The **sensory neurones** or receptive neurones are brought into communication with the muscles (effectors) by way of these motor neurones. The intermediary neurones are a later development, serving to bring one sensory neurone into connection with a large number of motor neurones.

Three working divisions are thus to be distinguished in the nervous systems of the higher animals. First in the order of stimulation are the receptors. In the higher vertebrates these receptors are very

specialized, as in the human retina or the taste buds of the tongue. In the lower forms of animal life the receptor may be little more than a free nervous termination, resembling the cut end of a thread and reacting almost uniformly to all types of stimulation, as in some of the coelenterates. The sensory neurones, when present, serve to convey the stimulation from the receptive cells to the other structures.

The next functional division to be distinguished is the associational, or intermediary, part of the neural organization. This division serves to bring the various parts of the receptive division into contact with a varied assortment of parts of the effectors. The effectors constitute the third division of the neuro-muscular system. The effectors proper are the muscles and glands. The motor neurones may be included in this division, since they transmit the nerve impulses from the sensory or intermediate neurones to the muscles.

MAN'S VERSATILITY

When we come to consider how the organism, whether Man or beast, works, it thus becomes necessary to include structures which are not really nerve tissues. So it has been the general practice to speak of the mechanism controlling behavior as a **neuro-muscular system**. The nervous system alone is of little use. It is only useful as it comes to be brought into connection with the structures which are capable of causing adjustments in the organism. This complete, three-phase mechanism is found in its entirety only in the higher animals. As we have already seen in the lower organisms only effectors may be present and in still higher forms all intermediary neurones are absent.

It is the intermediary neurones, however, that provide the basis for versatile performance of the higher animals, especially Man. In these organisms, the arrangement and structure of the intermediary parts of the neuromuscular system have come to assume a part more important in controlling the behavior of the animal than that possessed by the more primitive and older parts of the neuro-muscular system. The way in which these parts are arranged and

their functions are of such significance for the understanding of behavior that we will set aside the following chapter to consider these in detail.

The differences in size and complexity of the muscles and bones accounts for only a small portion of the differences in behavior be-

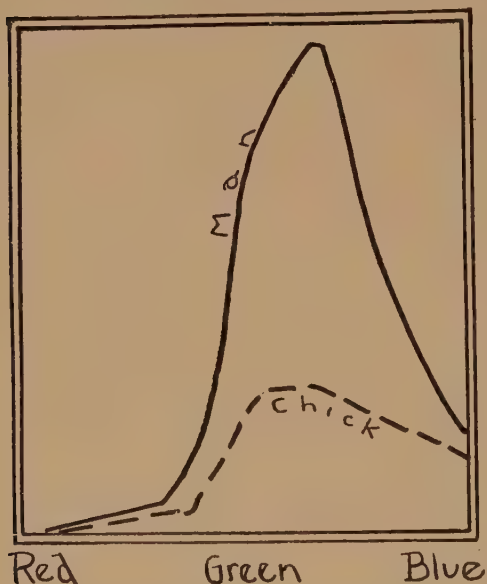


FIG. 14.—Many of Man's senses are keener than those of lower animals. Here is a diagram of the sensitivity of man and chickens to lights of different colors. The higher the curve is from the base the smaller amounts of light can be seen.

tween Man and the lower animals. The chief factor is the nervous system which controls and coördinates these largely mechanical structures; bone and muscle are the servants of the nervous structures. Many of the lower animals have only servants; the servants of Man have a master.

THE SENSES OF ANIMALS

Man differs from the beasts in having receptors that in many instances are vastly more effective. It is quite probable, for instance, that all animals except Man are color blind. At most, they confuse red and green and frequently all colors. Popular belief has it that the bull is angered by the waving of a red cloth. Granting, for the sake of the argument, that the bull does become enraged at the waving of a red cloth, it is very likely the *motion* of the cloth rather than the *color* that excites him to anger, for the bovines are blind to reds and greens. Elaborate experiments have been performed on large numbers of animals to determine this point. The upshot of these researches has been to prove that practically all

animals do not see colors. Man, however, does see colors—except in the case of about three or four people out of every hundred who are color-blind. Thus Man, in general possesses a more delicate and specialized receptor for light waves (eye) than do the lower animals.

LEARNING IN MAN AND BEAST

The presence of larger numbers of intermediary neurones in Man provides the basis for variable behavior and learning. Man's behavior is not so stereotyped as is that of the other animals, including even the chimpanzee and other of the primates that approximate Man the closest. Man learns far more quickly than the animals, and he can also unlearn more quickly than the animals. He does not continue the same identical types of reactions when they are found to be useless or to bring unpleasant consequences. Just how this learning and unlearning takes place we will take up in the chapter on Skills. Man also acquires more reactions than do the animals; he not only learns quicker, and with greater efficiency, but he learns more.

Due to the very highly developed intermediary neurones in the cerebral hemisphere of Man he comes to be a reasoner. Through the use of reasoning, Man finds out facts which escape the animals. Reasoning, in the strict psychological sense, is not found in the animals. Of course, it is true that animals can remember their master's appearance and clothes, that they can be taught to do many clever things; but this is not reasoning. As properly used, one reasons only when he arrives at some new and fairly accurate inference, which is not obvious to the eyes, ears, or other receptors. Mathematics is an example of reasoning in its most clear cut form perhaps. The mathematician deals with signs and symbols, not with real concrete things that can be handled and weighed; and yet he arrives at some new information or formula. Without the myriad thousands of intermediary neurones in his brain it would be beyond the capacity of Man to perform such feats of reasoning. But at that, probably Man does not reason quite so much as he would like to believe. True enough, he thinks a great deal; he recalls pleasant

occurrences; he decides to make a journey; but he very seldom weighs abstract facts and arrives at some new laws or inferences. As Wilhelm Wundt, the founder of the first university laboratory for the study of psychology, said, it is quite probable that Man reasons but little and the animals not at all. Elaborate experiments have shown that the highest intellectual feat that the cockroach can perform is to remember for almost a half hour. Compare this with the feat of the anatomist in learning the minute details of anatomy.

Man's supremacy through the versatility of his behavior is very patent. But Nature has a precarious way of doing things at times, and it is one of her ironies that this versatility at once becomes the strength and the weakness of Man. This will be a topic for discussion in the chapter following "Instincts and the Patient."

TOPICS FOR DISCUSSION

1. Can a cat learn more than a mouse, a dog more than a cat, men more than dogs, some men more than others?
2. Under which level of reaction listed in Chapter II does tropic behavior belong?
3. Would you say that the cell functions mentioned in Chapter III are highly specialized in a sponge?
4. Which are effectors, which receptors:
 - (a) the cochlea of the ear?
 - (b) the biceps?
 - (c) the vestigial muscles that wiggle the ear?
 - (d) the retina?
 - (e) the tongue.
5. When you burn one finger do you have to train the other fingers to keep out of the blaze? If you had a nervous system like the sea-anemone, would you have to train each finger separately?
6. Make a chart, listing in one column from the bottom up the order in which the neuro-muscular system developed. In another column list, from the bottom up, the order in which the parts of this same system work when stimulated.
7. Would you rather have a nervous system the cells of which could reproduce themselves or a nervous system with a large number of intermediary neurones?
8. What instances have you noticed in which animals seemed to have duller senses than men?
9. Is it any advantage to be able to un-learn as well as to learn?

CHAPTER V

THE BASIS OF HUMAN BEHAVIOR

The Place of the Nervous System—The Spinal Cord—The Cranial Nerves—The Nature and Significance of the Synapse—The Nutrition of the Nervous Structures—What a Nerve is—Order in the Nervous System—"Character Reading"—Levels of Control—The Nervous System Works as a Unit.

It is the nervous system and some closely analogous organs that constitute the basis of human behavior, as it is ordinarily thought of. These parts serve to bring one portion of the body into connection with other parts, so that when the one portion is stimulated it becomes possible for others to respond. In order to accomplish this, it is only natural to find that branches of the nervous system reach to **practically every portion of the body**; even the remotest structure is brought into communication with others through the medium of the system of nerves. Every muscle, every gland, every organ has an elaborate supply of nerve elements, which are arranged in a fairly uniform way from person to person. A nerve fibre is attached to about the middle of every muscle fibre in the body; around 14,000 nerve fibres are concerned with hearing, while Krause reports that there are one million nerve fibres in the optic nerve of Man. The human brain alone contains about 10,000 million nerve cells. These facts should aid one in forming some conception of the intricacy and the importance of his nervous system. There is no other bodily system, save the vascular system, which has so widespread a distribution; the vascular system is for the nourishment of the parts of the organism, the nervous system for bringing these parts into activity at the proper time, and with a proper relation to the other parts of the living organism.

The widespread distribution of the nerve tissues into every nook and cranny of the body does not preclude an **orderly distribution**. There is an extremely orderly arrangement, even down to the smallest microscopical detail. Two large divisions of the nervous system are usually distinguished, the **central division**, which consists of the portions of the nervous system lying within the spinal column and cranial cavity, and the **peripheral division** (pertaining to the external surface), which is commonly taken to include all the remaining parts of the nervous system. It should be noted that these two portions are more properly termed divisions, rather than systems. They are not independent systems, but simply rather arbitrary anatomical divisions for ease of study. **The nervous system works as an inter-related whole**; the central division is not independent of the others. This is an important point to be carried in mind.

Running up and down the central cavity in the spinal column is a thick cord-like nervous structure which is known as the **spinal cord**. This is not uniform in its structure throughout its entire length. At the level of the shoulders, many smaller nerves extend from the spinal cord to supply the muscles of the arms. This produces a slight but plainly visible enlargement, which is known as the *thoracic enlargement*. Lower down the cord there is another enlargement, at the region where the nerve supply from the lower limbs enters the cord; this is the *lumbar enlargement*.

A CROSS-SECTION OF THE SPINAL CORD

If the spinal cord is cut across with a sharp knife and the cut ends of the cord are examined, several significant features are noted. Perhaps the first observation is that the cord is not round but somewhat flattened. Then there will probably next be noted two small grooves located on opposite sides of the cord. The groove located on the side of the cord nearest the back is the *dorsal fissure*; the one on the belly side of the cord is the *ventral fissure*. The ventral fissure is the larger of the two. Between the fissures, running through the approximate centre of the spinal cord is a small

tube known as the central canal. This tube is continued into the brain as the ventricles.

Looking around the whitish substance of these cut ends of the spinal cord, it is seen that the coloration is not uniform at all parts of the cord. Around the outer part of the cord the substance is whiter and apparently firmer than in the central part. Closer observation discloses that the greyish part in the central portion of the cord is arranged in a somewhat H-shaped mass. This is the *central grey matter*. The lighter colored portion is the *white matter*. In just a short while we will take up a very interesting and important difference between these rather than color and name.

At the upper, or *cranial* (toward the head) end, the spinal cord becomes more flattened and gradually becomes much

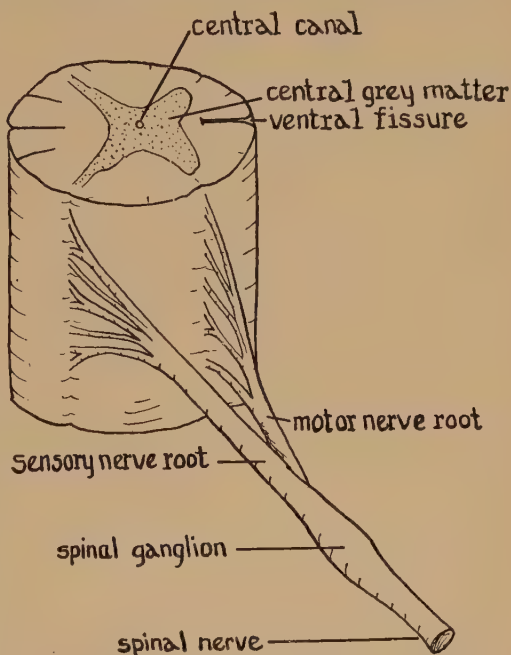


FIG. 15.—A short section of the spinal cord, showing the more important features.

modified in its internal structure. This upper end, which is still not the brain, is known as the **medulla oblongata** or sometimes as the **bulb**. On the dorsal side of the medulla is located a three-lobed arrangement of nervous tissue known as the **cerebellum**. On the ventral side of the medulla, directly opposite the cerebellum, is a little swelling which is the **pons**. This connects the cerebellum with the forward portions of the cerebrum.

To the front of the medulla is a short constriction which is very marked. This is known as the **isthmus**. The isthmus separates the medulla from the **cerebrum** or **brain proper**. All the structures which have been named have a certain specific task assigned to them in certain daily activities. This will be taken up later in the chapter under Localization of Function.

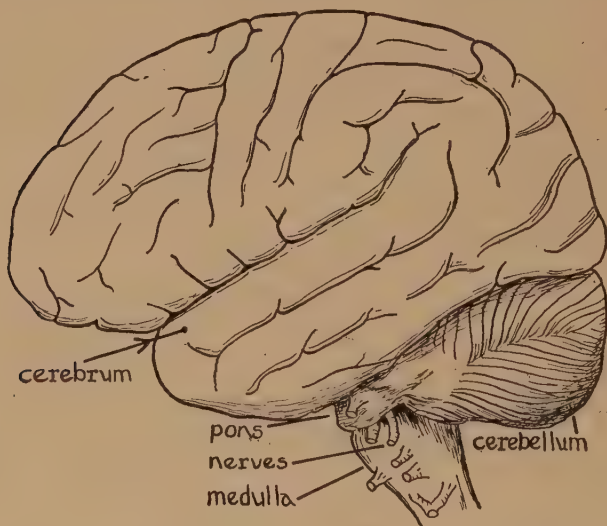


FIG. 16.—Drawing of the human brain viewed from the left side.

The parts which have been named, so far, are of the central division of the nervous system. We will now take notice of some of the more important parts of the peripheral division.

When we were examining the spinal cord, we perhaps noticed that at fairly equal distances smaller white cords were given off. These are especially noticeable, since in the human being these **spinal nerves** are arranged from the cord in certain definite ways. For instance, they originate from the spinal cord at points midway between the vertebræ of the spinal column. The small openings at the intersections of the bones of the spinal column permit these

peripheral nerves to leave the cord. It is almost astounding, however, to find that along the spinal cord there are four **nerve roots** given off at the level between each pair of vertebræ. These nerve roots are arranged in pairs, two toward each side of the body. One nerve root of each pair originates in the dorsal part of the spinal cord near the dorsal fissure; the other nerve root has its origin near the ventral horn of the H-shaped central grey matter. Two nerve roots unite to form a *spinal nerve*. (See Fig. 15.)

Those nerve fibres, which originate in the dorsal part of the cord, run to the receptors or sense organs situated all over the body. They are the beginnings of the **sensory nerves**. The ventral nerve root gives rise to the nerve fibres which run to the effectors which are the muscles and glands; these are the **motor nerves**.

COMING CLOSER TO THE BRAIN

As we approach the cranial end of the cord, where it becomes the medulla, these spinal nerves are no longer found. In their place are the **cranial nerves**. The spinal nerves are given off from four nerve roots which pass from the cord through the spaces between the vertebræ. In the region of the medulla, however, there is the solid bone of the skull. Nerves are given off here, one to the right and one to the left. These pass out through small openings in the skull which are called *foramina*. There are, altogether, twelve of these slender pairs of cranial nerves. Not all of them are limited in their termination to the head; some of the cranial nerves have their termination in the involuntary muscles of the intestine and other abdominal structures.

The parts of the nervous system which we have been studying so far are very complex, being composed of thousands upon thousands of minute nerve cells. The **neurone** is the unit out of which the nervous system is built. A neurone, or nerve cell, has a highly specialized form. The neurones of the peripheral nerves are commonly, enormously elongated threads running from the spinal cord to the hand or foot or other portions of the body.

Somewhere along this microscopic thread of nerve tissues is a small enlargement which contains the **nucleus**. The nucleus is usually located nearer one end of the thread.

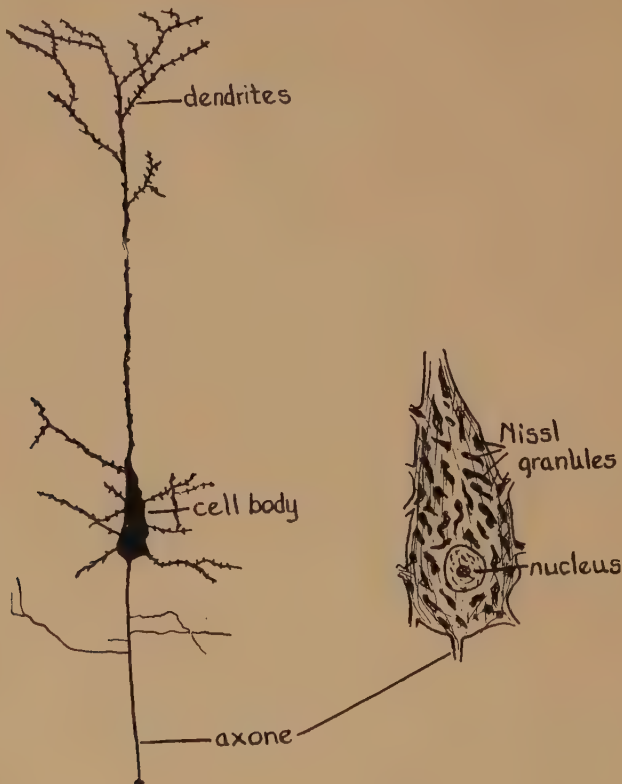


FIG. 17.—One type of neurone found in human beings. Only a small portion of the axone is illustrated. To the right, the cell body is magnified still more. This shows the nucleus and Nissl granules.

A typical neurone appears somewhat like the one illustrated in Fig. 18. Here we see the larger portion containing the nucleus; this swelling is known as the **cell body**. The long, slender processes, given off from the cell body, serve to connect the different parts of the body which are served by the particular neurone. The part of the neurone which receives the stimulation and begins

the transmission to other parts of the body is known as the **dendrite**. In the sensory neurones it is the dendrite which is first affected by the changes produced by light, sound, or heat, on the receptor. The nervous impulse passes along the dendrite, into the cell body, and out through the **axone**.

THE NATURE AND SIGNIFICANCE OF THE SYNAPSE

The axone may be attached to an effector such as gland or muscle tissue. The impulse when transferred to these causes them to secrete or contract. The axone may be in connection with the dendrite of another neurone, which may pass the impulse on in turn to another neurone or to an effector. **Chains** of neurones are quite common. When one neurone comes into contact with another, the point of connection is known as a **synapse**. The synapse is very important in behavior.

The synapse offers a resistance to the passage of the nerve impulse. Most of the time which elapses between the application of a stimulus and the response to that stimulus is due to the loss of time in the synapse. It is only to be expected, accordingly, that the slowest reactions are those involving the most synapses. The resistance of the synapse is modified by certain conditions. Strychnine and coffee lessen the synaptic resistance. The patient with strychnine poisoning is thrown into convulsions over the slightest cause. Alcohol and the anæsthetics increase the synaptic resistance. The person who is "nervous" is one whose synaptic resistances are low; high synaptic resistances conserve the resources of the organism.

The motor neurones which are attached to the muscle fibres do not come into direct contact with the myofibril, but are separated by a small **end plate**. This end plate, rather than the neurones or muscles, is responsible for many phenomena, just as the synapse is at the base of certain sorts of nervousness. Neither the muscle nor the nerve fibre is affected by fatigue. The vulnerable parts for fatigue are the end plates.

The activity which takes place in the neurones when they are stimulated is called the **nerve impulse**. This travels at about the

rate of an express train running with a clear track ahead. The exact nature of the nerve impulse is not known. Just what it is that causes one neurone to transmit this impulse when stimulated, is one of Nature's secrets which she has not yet unfolded. It may be electrical, chemical, both, or neither. Certain it is, however, that energy is utilized by the neurone in its action. This energy, as in the case of all bodily organs, is obtained through the medium of the blood.

THE NUTRITION OF THE NERVOUS STRUCTURES

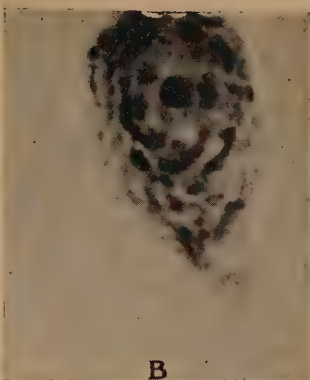
The brain has the most effective circulation of any portion of the body. Stoppage of the circulation of the brain results in almost immediate loss of consciousness. The venous blood from the brain is unusually dark, indicating active metabolism. The ganglia and plexi of nerve cells are strategically situated where they will receive a plentiful supply of blood.

This indicates that the cell body is the **active centre for nutrition**. The cell body of the neurone is very sensitive to changes in oxygen. In the absence of oxygen, the neurone is rapidly fatigued. Carbon dioxide is continually being produced in the neurone and under stimulation this is increased almost three times. Excessive use of a neurone causes the disappearance of the **Nissl granules** from the cell body; after resting, these granules are renewed.

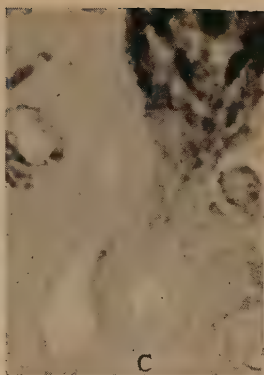
The degeneration of the neurone may be carried so far as to cause the death of the nerve cell. When this occurs, another cell does not grow to take the place of the one lost, for nerve cells do not reproduce themselves. Their gain in irritability and conductivity seems to be accompanied by a loss of the function of reproduction. When degeneration takes place in the lower levels, as in the spinal cord, it usually means that the loss is complete. In the case of the higher centres, however, other parts may be trained to take over the functions served by the degenerated cells. This is possible in the higher centres, because of the presence there of the intermediary neurones in large numbers. This reëducation is very significant and will be taken up in the chapters on the skills.



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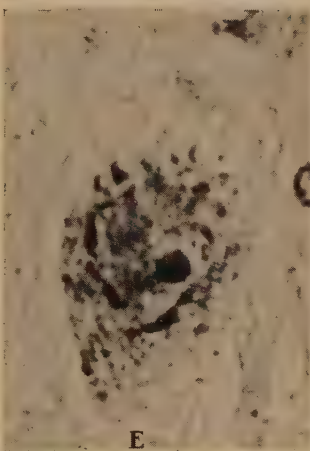
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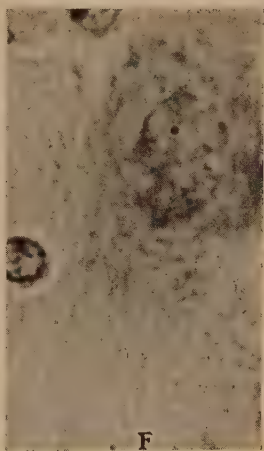
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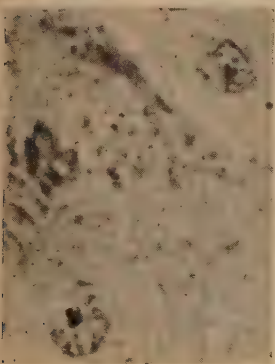
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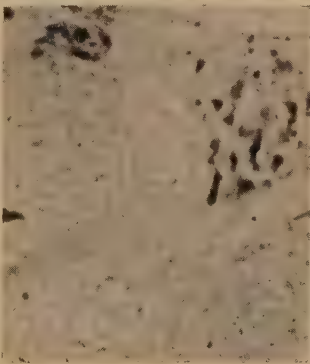
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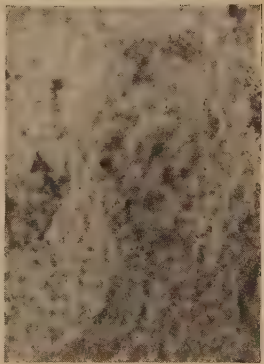
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FIG. 18.—Actual photographs of nerve-cell bodies under the high power of the microscope showing the loss of the Nissi granules with exercise. The photographs show increasing loss from A to I where the nerve cell is disintegrated. (After Crile.)

WHAT A NERVE IS

The neurone, we have said, is the unit of structure of the nervous system. What we found on our examination with the naked eye of the spinal cord as a ventral nerve root is in reality a group of innumerable axones which can be seen only under the higher powers of the microscope. **What is ordinarily called a nerve, then, is in reality a grouping together of axones or dendrites.** A nerve is a cable made up of perhaps several thousand fibres. In the case of the motor nerve roots of the spinal cord we have only the axones of the motor neurones. The dendrites of these neurones are located within the spinal cord and are in connection with the axones of other neurones. The cell body of the motor neurones is located within the grey matter in the central portion of the spinal cord. The white matter is made up largely of axones and dendrites. The white matter of the spinal cord is thus seen to be much like the peripheral nerves since they are composed principally of **nerve fibres.**

The sensory nerves, also, are made up of an immense number of minute neurones. They differ from the motor nerves in that the axone of the sensory neurone is largely within the spinal cord, while the dendrite is connected with the eye or the sense receptors in the skin of the hand. The cell body of the sensory neurones also is located outside the spinal cord in the little enlargement of the dorsal root. This enlargement, where the cell bodies are grouped together, is known as a **ganglion**. This is a term applied to all parts of the nervous system where the cell bodies are gathered together in any quantity. Certain portions of the medulla, for example, are composed largely of cell bodies and these parts are sometimes known as *ganglia*. The cerebrum might be considered as a mammoth ganglion; in the cerebrum the cell bodies are located on the outer surface, while the axones and dendrites are inside. This makes the grey matter of the brain outside; just the opposite, it will be recalled, of what exists in the spinal cord.

ORDER IN THE NERVOUS SYSTEM

The orderly arrangement of the smallest parts of the nervous system is becoming more and more apparent as we progress in our study. All the neurones which serve a certain effector or receptor are arranged in the peripheral division into nerves. The cell bodies of certain neurones which have related functions are grouped together in the same ganglia. The parts of the neurones, either axones or dendrite, which enter the spinal cord, invariably follow a certain path within the cord. These portions within the central division of the nervous system where certain common neurone fibres ascend or descend, are known as **tracts**.

The nervous system is not arranged like boarding-house hash with everything thrown together in any old way. Certain definite tracts within the central division are made up of the dendrites of neurones which stimulate the arm muscles in throwing a ball; another definite tract in the spinal cord and the brain carry axones of the neurones which are stimulated when the fingers are pulled across a piece of velvet.

The different parts of the nervous system thus have certain **definite functions to perform**. We may take walking as an example. Ordinarily, there is not much concern over how to take the steps involved in locomotion. But practically the whole nervous system is involved. The control of the leg muscles, so that one foot is placed forward after the other in a definite order, is located in the spinal cord. But one always walks erect, regardless of whether the ground is even or uphill. The erectness is regulated through the

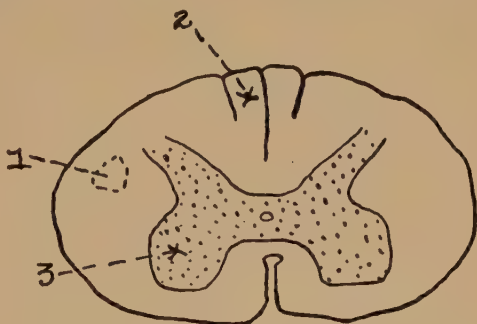


FIG. 19.—Cross section of the spinal cord at about the level of the arms, showing a few of the tracts to be found there. 1. Neurones going from brain to muscles. 2. Sensory neurones which carry impulses to the brain. 3. Here originate the neurones that go to the muscles of the arms. The cell bodies of these neurones are located in this part of the grey matter.

cerebellum. The cerebrum receives the impulses from the eyes and ears, and correlates these with the movements made by the lower limbs so that the muddy spot is avoided, so that one avoids the automobile after hearing the warning shriek. Certain groups of neurones control the heart beat, others are active under stimulation by light but not under sound stimulation. This is what is meant by **localization of function**.

“CHARACTER READING”

Localization of function is a descendant of **phrenology**. About 1830, the phrenologists claimed that by “reading” certain features of the shape of the head they could tell a man’s character. Certain bumps on the head represented love of children, another bump stood for submissiveness, and so on through a long range of characteristics. By the year 1860, only the most credulous people believed in phrenology. To-day no scientific recognition whatever is given phrenology or its direct offspring “**character reading**.”

Localization of function is much different from phrenology or character reading. The phrenologist, or character analyst, studies the shape of the skull, the length of the fingers, the features of the profile, the shape of the belly and other physical characters to determine if the person will make a good executive or may be trusted with funds. But when the scientist speaks of localization of function he means something entirely different. First of all he looks in the nervous tissues rather than in the shape of the face and the contour of shoulders for determining characteristics. And, secondly, the modern scientist does not look for the centre of such a complex trait as “lovableness,” for he knows that one loves or hates with his whole organism and not just a fraction thereof.

The only reliable localization of function is in the nervous tissues and not in the face and the fingers. And then the localization is for rather definite things and not such abstract qualities as the “amicability” of the character analyst. Certain portions of the central nervous system contain very definite groups of nerve

fibres and cells which control certain functions. The reflex jerk of the leg when it is tapped just below the knee cap has a controlling centre in the lumbar enlargement of the spinal cord. The remainder of the spinal cord can be cut away and still the knee-jerk will take place. Certain diseases, such as locomotor ataxia, cause severe changes in the spinal cord in the lumbar region, and the result is that, quite commonly, the knee jerk is altered.

LEVELS OF CONTROL

The knee jerk is just one example of the many actions which have their controlling centres localized in known portions of the spinal cord. These actions take place whether the brain is in the animal or not. Of course such a *decerebrate animal* does not know what is going on, but the responses take place just the same.

At the **higher levels** of the spinal cord more complex functions have their centres. The functions which are under the control of these higher centres are not so essential for life as are those localized in the cord, but they are the ones which make the difference between Man and beast. The responses localized at the higher levels are those which make life interesting and worth living.

It is commonly observed that when a loud sound suddenly breaks forth that there is a momentary closing of the eyes. The eyes blink involuntarily: the centre for this response is in the pons. The contraction of the pupil of the eye in bright light is also mediated through the midbrain. At the level of the *thalami*, in the base of the brain, is a centre for *affective-tone*. Diseases which cause changes in the neurones in the thalami cause changes in the disposition and affective-tone of the afflicted person.

Certain definite functions have been localized in the cerebrum. One small area has gathered together the cell bodies of those neurones which regulate the muscles in speech. Other areas have the cell bodies, which stand supreme over other muscular movements. The more prominent of these are shown in Fig. 20. Other definite areas have localized the cell bodies that function in seeing;

others in hearing; others in speech; others in controlling muscles.

It is not known just which areas are concerned with thinking and remembering. The character analyst may think he knows; but probably he does not; he is just "kidding" himself and his clients along and making a comfortable living in the meantime. It is quite probable that thinking takes place somewhere in the cerebrum. When that is removed, or disease cuts it off from the rest of the nervous system, thinking comes to a standstill. Frogs that have had their cerebrum removed behave in a machine-like and invariable manner. Predicting their actions is a fairly easy affair; it becomes more difficult to predict the behavior of animals possessed of a well-developed cerebrum. The cerebrum is richest in intermediary neurones of any of the nerve structures. It thus serves to bring varying sets of neurones into connection with each other. Man is equipped with the largest proportion of intermediary neurones of any living organism. This furnishes a basis for the highly complex and controlled behavior of the human being.

THE NERVOUS SYSTEM WORKS AS A UNIT

As for memory, it is quite probable that one remembers with every element of nerve tissue. Practically all the activities of daily life involve the coöperation of large and widely distributed areas of the nervous system. It is through the agency of the intermediary neurones that this interrelating and correlating is brought about. These intermediary neurones are found only in the central division of the nervous system. The brain or cerebrum is composed of little else than intermediary neurones.

Functions other than memory may also be localized in varying parts of the nerve structures. Spoken language, for instance, is usually localized in Broca's convolution (see Fig. 20). Now in case of accidents or disease which causes a destruction of the nerve cells in this area, there is a loss of the power to speak. But this loss need not be permanent. Due to the associational neurones in the cerebrum it is easily possible to bring other areas of the brain into

function in spoken language. Other areas do not take over this function immediately, however. A long period of training or **reëducation** is needed to bring about this transfer of function. Other functions, such as the change from right- to left-handedness in the amputation case, can also be reëducated so that formerly neutral groups of cell bodies come to preside over the function.

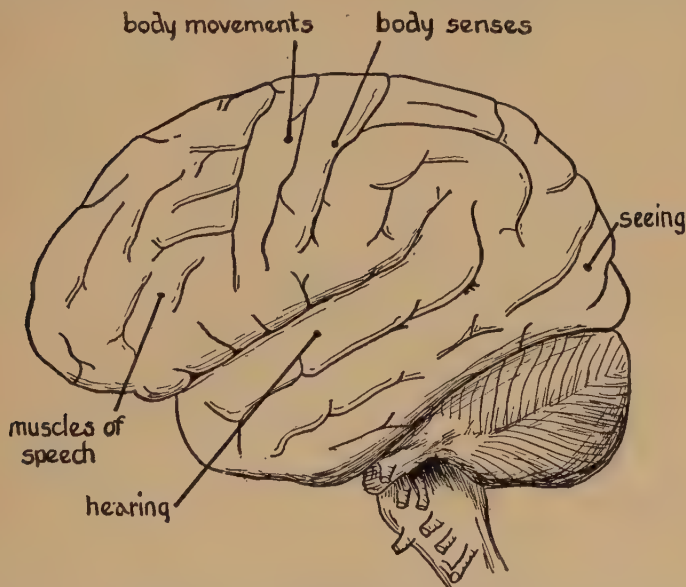


FIG. 20.—Drawing showing the functions controlled by different parts of the human cerebrum.

This matter of reëducation is so preëminently important that it will be given more detailed treatment in a later place.

A very important part of the nervous system has not yet been mentioned. So far, we have been concerned in the main with the parts that are used most in the control of the skeletal muscles. We must now turn our attention to a part of the nervous system that is vital for the processes of life itself, and that is intimately related to the qualities which make up personality. This is the *autonomic division* to which we turn in the following chapter.

TOPICS FOR DISCUSSION

1. Which of the following belong to the central and which to the peripheral division of the nervous system:

- (a) the retina?
- (b) the medulla?
- (c) the cerebellum?
- (d) the pons?
- (e) the ulnar nerve?
- (f) the solar plexus?
- (g) the cerebrum?
- (h) the auditory nerve?

2. Are synapses found in the nervous system of the sea-anemone?

3. What are foods that are supposed to replenish nervous tissues?

4. How are phrenology and physiognomy alike, how different?

5. A modern physiognomist teaches that people with square heads give careful attention to details, that people with high, narrow forehead are not interested in financial matters, that people with short heads are social radicals, and that blondes make the best business men? Whom do you know that do not work out according to this system?

CHAPTER VI

THE ORIGIN OF MAN'S NEEDS

Vegetative Functions—The Autonomic System—Why a Sick Kidney Causes a Pain in the Head—The Background of Personality—The Most Primitive Control of Behavior—The Function of the Ductless Glands—The Glands of Sex—Ductless Glands: the Autonomic and Central Nervous System.

THE autonomic division of the nervous system plays a very important part in the control of the activities of the visceral organs. Digestion, elimination, glandular secretions are under the control of the autonomic parts of the nervous system. It is, accordingly, sometimes called the **vegetative nervous system** since it presides over the vegetative functions of the body. Some of the internal organs are able to perform their functions at the proper time without any nervous control whatever. The heart muscle, for instance, will continue beating in its usual rhythmic manner when separated from all nervous connections. Many of the intestinal glands, also, are excited to secretions without the need for nervous control, the mere presence of food and general tension of the stomach walls serving to cause these glands to liberate their secretions. But these independent functions are few. By far the greater amount of the visceral activities are regulated by the autonomic portions of the peripheral division of the nervous system.

The autonomic division differs from the remainder of the peripheral parts of the nervous system in several significant ways. In the first place, it **supplies chiefly involuntary (unstriated) muscles and glands**. Secondly, it **has a separate series of ganglia** along the spinal cord. Third, there is a difference in the **structure of the neurones** when viewed under high magnification.

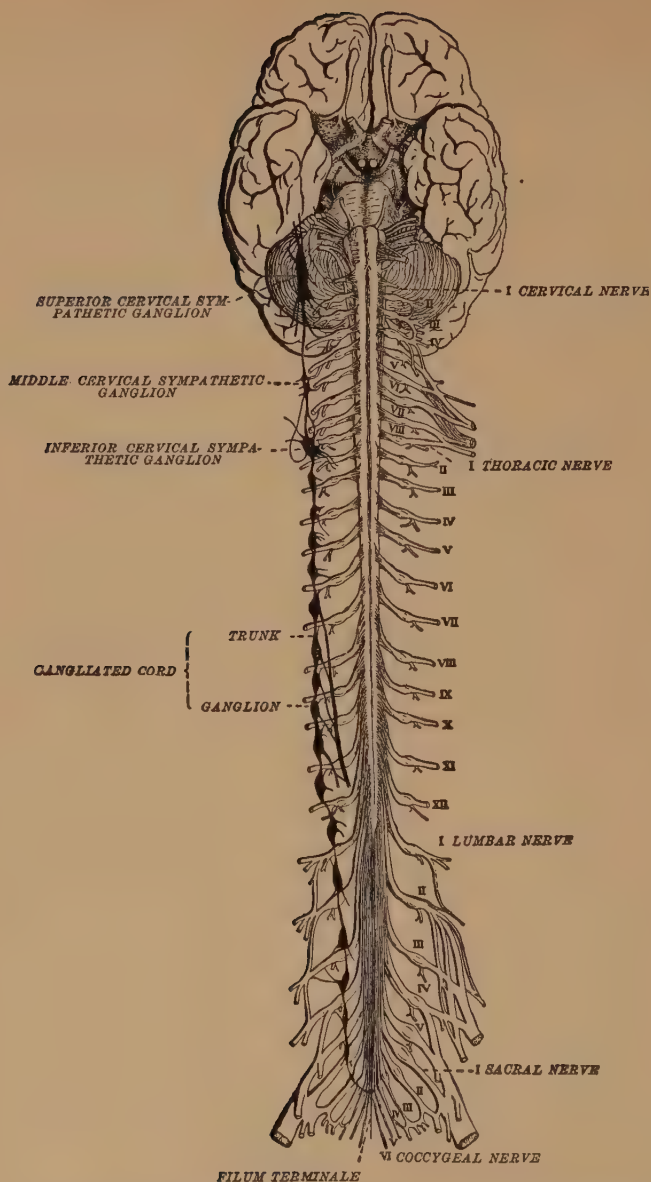


FIG. 21.—Drawing showing the way in which the autonomic neurones are connected with the central neurones. The darker ganglia along the spinal cord are the spinal chain ganglia. Other similar structures on the opposite side of the cord are not shown in this drawing.

And, fourth, a large number of the autonomic neurones are fused together in a **nerve net** type of construction, mentioned in the chapter on Man and Beast. It is quite probable that the autonomic nerves are the remnants of the more primitive nervous systems. The central division and the other nerves of the peripheral division are later evolutionary additions.

It is possible for the autonomic nerves to control the activities of digestion, peristalsis, and glandular secretion without any aid from the central nervous system. The autonomic nerves, however, are nevertheless connected with the spinal cord and medulla. A short distance from the spinal cord, small groups of minute nerve fibres may be seen. These are distributed somewhat as shown in Fig. 21. This chain of ganglia, it will be noted, extends practically the entire length of the spinal cord. This group of ganglia is known as the **vertebral chain**; one chain is on each side of the spinal cord. Nerve fibres connect these ganglia with the spinal cord; most of the fibres, however, extend from these chains or ganglia to the organs which are under the control of the autonomic nerves.



FIG. 22.—A villus from the small intestine of man showing the neurones with the nerve-net construction of this portion of the autonomic nervous system.

Other ganglia, composed of elements from the autonomic nerves, lie farther from the spinal cord and near the organs served. These are usually known as **plexi**; as a rule, in the plexi, the typical nerve net type of construction is found.

WHY A SICK KIDNEY CAUSES A PAIN IN THE HEAD

Ordinarily one is never aware of the stimulations received or given by the autonomic nerves. They are in connection with the sensory neurones, however, as shown in Fig. 23. When a sensory impulse is brought in along the sensory autonomic neurone, it may be transferred to one of the peripheral sensory neurones, as indicated in the spinal root ganglion. Thus a stimulation of a sensory

autonomic neurone, say at the hip joint, may be transferred in the spinal ganglion to a neurone coming from the knee. The result is that a disturbance in one part of the body may produce apparent pain in other parts. This is what is meant by **referred pains**. All sensations of pain are, accordingly, somewhat deceptive, unless studied by one aware of possible deceptions. Because patients say they have pains in their chest does not necessarily mean that they are suffering from lung trouble; it is just as likely to be of

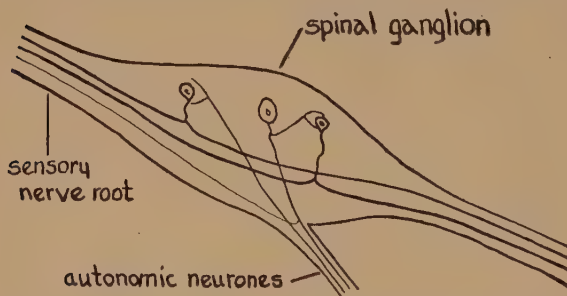


FIG. 23.—This diagram shows how the neurones connected with the autonomic division of the nervous system may transmit sensory impulses into the central portion of the nervous system. A few neurones are illustrated in a spinal ganglion. The spinal cord would be to the left if it were drawn. The neurones from the autonomic divisions are drawn in lighter lines. Notice how the axone of one of these passes into the spinal cord. Another transfers its impulses to a sensory cell body: this is why a pain in the head may really be due to a visceral disturbance.

gastric origin as respiratory.

Langley has discovered that the autonomic nerves belong to three sharply separated divisions. These are indicated in Fig. 24. The autonomic neurones, originating at the cranial

end of the spinal cord and at the sacral end, are limited in their distribution, going to only a few structures. The function of these cranial and sacral autonomic neurones is to conserve bodily resources. But for each organ or gland which is conserved by one of these neurones, there is also an autonomic neurone from the larger central portion. These neurones from the thoracic-lumbar division are in antagonism to the others; the thoracic-lumbar neurones tear down and use up the bodily resources while the others are conserving.

THE BACK-GROUND OF PERSONALITY

In emotional states there is no conservation of the bodily resources. It is the thoracic-lumbar division of the autonomic

neurones that is controlling the viscera in emotions! Even slight disturbances or alterations in the working of the autonomic neurones may produce marked changes in personality. Certain drugs affect the autonomic neurones differently. **Nicotine** paralyzes the ganglia chains which connect the autonomic neurones with the spinal cord. This drug thus shuts off all impulses from the viscera, and prevents any central control of the autonomic functions. **Atropin** and **pilocarpin** affect chiefly the cranial and sacral autonomic neurones. **Andrenalin** (see chapters on temperament and immediately following paragraphs) influences principally the thoracic-lumbar neurones.

The condition in which the autonomic neurones keep the vital organs is the background for a large amount of one's personality characteristics. Sensory impulses from the autonomic nerves may be carried to the central neurones. These vague, ill-defined feelings supply the general organic set characteristic of well-being or its allied conditions.

Since the autonomic nervous structures are in control over the

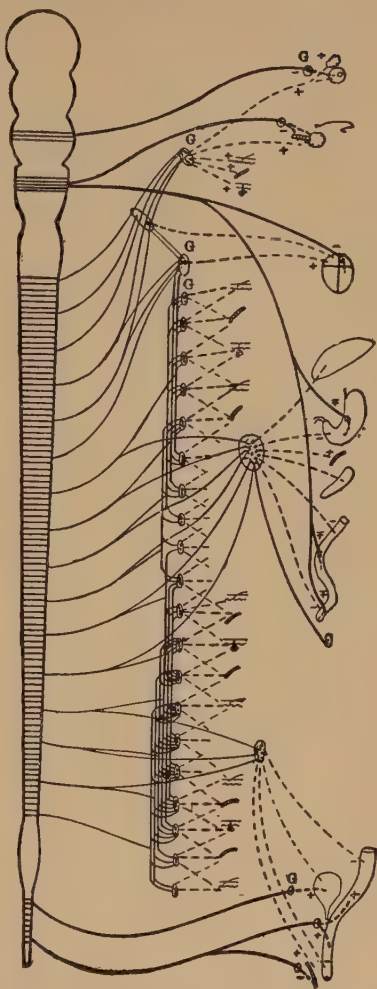


FIG. 24.—Diagram of the distribution of the autonomic nervous system. The spinal cord and brain stem are represented to the left. The organs served by the different divisions of the autonomic neurones are represented to the right. A plus sign indicates that the neurones increase the activity of the organ. Note that many organs are supplied with neurones from more than one division, being antagonistic to each other.

processes of life itself, one is not surprised to find that the fibres of the autonomic division respond to much weaker stimuli than do the fibres of the central nervous system. Not all the impulses affecting the autonomic neurones break through into the central neurones, but when they do, the central neurones become the servants of the autonomic. The pangs of hunger, for instance, originate in the autonomic, but they cause the central neurones to alter the behavior of the organism so that the hunger is satisfied. The autonomic neurones give rise to Man's more organic desires and needs, whereupon the central neurones adjust the organism to its environment in such a manner that these needs or desires may be satisfied. Intense and persistent needs of the autonomic functions cause the central nervous system to lay aside all else in the struggle to provide for these needs.

THE MOST PRIMITIVE CONTROL OF BEHAVIOR

We have left for discussion the most elemental form of control over human behavior. It will be recalled that in the chapter on psychology and medicine various levels of reaction were enumerated. So far in the present chapter we have been considering only the control of behavior by a system of neurones. We have remaining for our brief study the control of behavior at a lower level, namely, the **physico-chemical** control of behavior.

Scattered throughout the body are numerous glands. Some of these glands pour their secretions out along the outer surface of the body or along the digestive tube. These glands are the glands of external secretion. Such glands are the sweat glands, the salivary and accessory glands, the tear glands, and the intestinal glands. These glands are duct glands, small tubes or ducts carry their secretions to the point where they are to be utilized by the organism. Their secretions are poured directly on the body surface or directly on the food which they are to digest.

Contrasted with these are the **glands of internal secretion** or the so-called **ductless glands**. Such glands are the thyroid, the thymus, the adrenals, the pituitary, and the sex glands. These glands pour their secretions into the blood stream. The blood

serves to transport the secretions to remoter parts of the organism where it may bring about some change. Changes may thus be effected in one portion of the organism by the secretion of a ductless gland at a remote part of the body. Thus these glands really utilize the entire vascular system as their ducts. All the ductless glands have a rich blood supply. The wide diffusion of their secretions is one reason for their importance in the study of behavior.

THE FUNCTION OF THE DUCTLESS GLANDS

The secretions of these ductless glands have very important functions. The secretion of the **thymus** gland is influential in bringing about the rapid growth of children; when adult size is reached, the thymus gradually declines and frequently disappears entirely.

The **thyroid** is another ductless gland which has a widespread influence upon the physiological processes in the living organism. The secretion of the thyroid is known as thyroxin. This is carried through the blood stream to the cells of the body, where it serves to accelerate metabolism. Thyroxin hastens the chemical processes of life. It has been found that one milligram of thyroxin increases the rate of metabolism by two per cent.!

But thyroxin is as remarkable in its influences upon the mental life as it is in accelerating bodily metabolism. Individuals with a deficiency in this secretion become mentally sluggish, unemotional, dull. In cases of severe deficiency, as in cretinism, actual feeble-mindedness may be the outcome. Simply feeding the **cretin** on thyroxin, extracted from normal thyroids, brings about a wonderful improvement in bodily and mental development. Other abnormal cases may have a hypersecretion of the thyroxin. When this is the case **emotional instability**, fear, and worries result. A rich supply of thyroxin brings, with its physical effects, a mental enthusiasm and joy in life characteristic of the sanguine personality. Too abundant a supply, however, brings the disastrous effects of an over-emotional mental life.

THE GLANDS OF SEX

The **gonads** or sex glands have important functions, aside from their connection with the purely sexual functions. It is a commonplace observation that, during puberty, when the gonads are maturing that there is a change in certain characteristics of a person. The boy's voice begins to deepen and become more masculine, he coaxes a growth of beard. The girl's figure begins to take on womanish contour, feminine characteristics appear. In the absence of the gonads, these changes of **puberty** fail to occur. The young rooster who has had his sex glands removed does not retain the plumage and comb of the normal male. As a fighter, almost any old hen can give him the worst of the affair. And in the spring of the year this sterilized male bird may actually sit on a hatching of eggs and rear a brood of chicks! The whole array of **secondary sexual characters**, both physiological and mental, depends upon the presence of the proper internal secretions from some ductless glands.

Perhaps the most widespread and marked responses are brought about by the secretion of the **adrenal**. It is quite probable that this gland plays some part in the continued welfare of the organism. It probably influences in some manner the end plate between the axone and the muscle fibre. Under proper stimulation, however, the adrenalin is poured into the blood stream in increased amounts. Then it begins to change things. When it comes into contact with the cells of the liver, it causes them to liberate their reserve supply of **sugar**. This sugar is carried to the skeletal muscles where it provides a **supply of energy**. The adrenalin also alters the distribution of the blood itself, driving it from the internal organs outward to the voluntary muscles. It is significant that adrenalin is secreted in effective quantities mainly in the case of the emotions. Fear, anger, pugnacity involve the adrenal. The masculine type of woman is one with hyperactive adrenal.

It is all very well to study, in this manner, the effects produced by the individual glandular secretions. But in the ordinary bodily

economy there is marked **coöperation and interrelation of function** between these ductless glands. The growth of the brain is presided over by the adrenal, thymus, thyroid, and pituitary secretions. The speed of its chemical reactions is under the control of these secretions, as a sort of a board of directors. In the absence or excess of any of these interrelated secretions, there is a consequent change in the chemical processes in the brain, and thought itself is probably modified.

But in the ductless glands not all is coöperative. Some of the glands have **opposed functions**. The pituitary and thyroid are in somewhat of a balance, the one restraining the other. Upon the removal of the thyroid, there is a compensating overgrowth of the pituitary. The thymus and the thyroid are also rather in antagonism; the thymus is the gland that prolongs childhood, the thyroid hastens the advent of puberty.

DUCTLESS GLANDS—THE AUTONOMIC AND CENTRAL NERVOUS SYSTEM

This strife and coöperation between the ductless glands is regulated in the interests of the welfare of the organism by the autonomic nervous system. The autonomic nerves, however, are themselves, to a certain extent, influenced by the internal secretions. It is a sort of vicious circle, without beginning or end and running in either direction.

The autonomic and ductless systems together supply **the organic basis of many of the needs of daily life**. Hunger may be the result of autonomic impulses, or it may be produced by injecting a small portion of the blood of a hungry animal into a well-fed animal, this blood carrying in it certain glandular products. The testis, ovary, and pituitary determine the sex and maternal instincts. Fatigue is largely endocrine weakness; "that tired feeling" is more likely due to adrenal insufficiency rather than to coffee or overwork. Doses of adrenalin do away with fatigue.

A change of any consequence in the secretions of these ductless

glands brings about characteristic changes in the personality. Their effects are similar to those produced by the autonomic nerves. As a matter of fact, the action of the ductless glands is analogous to nerve action since they bring about changes in distant parts of the organism. Together the ductless glands and the autonomic nervous system regulate the vital activities of the organism. The central nervous system has eyes, ears, and other sense organs. It serves to bring the organism into such a relation with its environment that the need may be satisfied. The central neurones must be sensitive to changes in the outer world and the inner world of the organism itself. That this is accomplished is indicated by efficient adjustments to varying situations in the higher vertebrates. That the central nervous system of Man is built with this in view is demonstrated by the fact that it contains over three times as many sensory as motor neurones.

The manner in which the nerve structures work in bringing about a harmonious adjustment to the outer and inner forces will be our subject for the next chapter.

TOPICS FOR DISCUSSION

1. Do diseases that involve parts of the body served by the autonomic nervous system cause more restlessness by disturbing Man's needs than diseases involving other parts of the nervous system?
2. Why is it best to speak of the central and peripheral *division* of the nervous system and still speak about the autonomic nervous system?
3. Cite instances of referred pains, such as, for instance, when you felt a toothache in the upper jaw and the dentist found that the ailing tooth was in the lower jaw.
4. Amputation cases oftentimes complain of pain in the amputated limb, although that obviously can no longer cause them discomfort. How do you account for such deceptive feelings of pain?
5. Since the autonomic nervous system and the ductless glands dominate in forming one's personality, should we look with contempt and disdain upon folks with dwarfed and twisted personalities?
6. Is the cranial or the thoracico-lumbar section of the autonomic controlling in the personality of the person who "always has his back up" and is looking for trouble?

CHAPTER VII

SIMPLE BEHAVIOR IN MAN

**Tropic Behavior—Reflex Behavior—Integration in the Nervous System
—The Neurone Pattern—Correlation: Coördination: Association—
The Modification of Neurone Patterns—Returning Good for Evil.**

THE simplest type of behavior is that which takes place in tropisms. Here, as in the case of the amœbæ, a response takes place to a stimulation without the intervention of any control by nervous tissues. Some **tropic behavior** exists in Man in the activities controlled by the ductless glands. Man's responses to the inner needs and the outer world, however, are not at all tropic. The behavior of human beings is mediated almost entirely through nerve structures. We have seen, in the immediately preceding pages, how the unit out of which the nervous system is built is the neurone. Now we must recognize a strange fact: the nervous system does not function by individual cells, but by chains and aggregations of cells. The unit of function of the nervous system is known as the reflex arc.

For the orderly working of the nervous system, sense organs or receptors are needed, as well as neurones connecting these with other neurones, and some muscle or gland for a final response. In their simplest form this working unit gives rise to what are known as **reflex actions**. In the reflex action, a stimulus is applied to some receptor and in response, some muscle or gland is aroused to activity. When the sole of the foot of a sleeping baby is lightly stroked, the toes are flexed; the response was of a reflex nature, the toes moved without the babe knowing it or wanting to move them, a sensory stimulation was converted into a motor response. This is the essence of reflex actions.

Now, when the sleeping babe was stroked on the sole of the foot the muscles did not contract directly as a result of the light pressure; neither was the nervous impulse transmitted diagonally upward

from the sole of the foot to the toes a couple of inches distant. Far from that. What happened was that the stroking stimulated a group of receptor cells that were connected with a sensory nerve. These sensory nerves extend from the skin of the foot to the spinal cord which they enter through a dorsal root. The irritation set up by stroking the skin was transmitted along this sensory nerve into the spinal cord, and out again along a motor nerve that ended in the muscles that contracted and caused the movement of the toes. It is

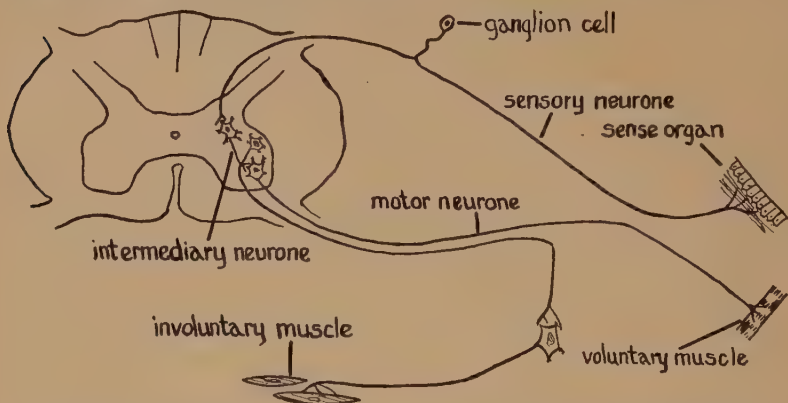


FIG. 25.—The principal neurone elements involved in the simplest reflex behavior. Other neurone branches ascending and descending, not illustrated, bring this reflex arc into connection with other reflex arcs.

a case of the longest way around being the shortest way home. And it almost seems like a waste of time and nerve tissue to follow this circuitous path in obtaining such a simple response. But it is really for the economy of the organism that reactions go over long paths such as this. When the sensory fibres enter the spinal cord they divide and send out branches. Some of these branches ascend the cord and come into contact in synapses with other neurones, which may reach to the cerebrum. This provision of Nature brings all responses together in a common structure where they may be related to each other.

In the healthy adult, pressure on the bottom of the foot may lead to removing a grain of sand from the shoe, smoothing out the hosiery, or going to the cobbler. If the sensory impulses had been

taken right over to the toe muscles, there would have been merely a movement of the toes. But with the impulses entering the central nervous system, they can be adjusted in the most effective manner. This adjustment, in the case of reflex reactions, takes place largely without any assistance outside of the spinal cord.

INTEGRATION IN THE NERVOUS SYSTEM

Something occurs in the central nervous system between the arrival of the nervous impulse along a sensory nerve and its departure along a motor nerve. First of all there is much **more time consumed** there than one would expect. The most important modification, however, is that, by some way or another, the nerve impulse is **distributed** in the spinal cord to certain groups of neurones that work in harmony. When the motor nerve is stimulated directly, a diffuse, poorly regulated muscular response takes place. But when the sensory nerve is stimulated, *then* an orderly response is made

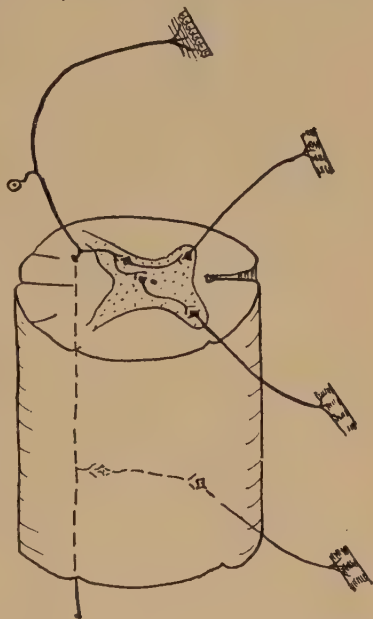


FIG. 26.—Diagram of how neurone connections are made within the central nervous system. The branches of the sensory axone connect with intermediary neurones. Some of the axone branches ascend through the cord into higher levels, some descend to lower levels. This wide interconnection brings the body into a unified control.

possible by the integrating activities of the spinal cord. In the case of the more complex reflexes and activities that are not all reflex, this correlating of impulses occurs in the higher levels of the central nervous system, such as the medulla or the cerebrum.

Some common activities of mankind that are typical of reflex behavior are sneezing, coughing, vomiting, sucking, and blinking the eyes in a bright light. These are all a fairly simple sort of behavior, about which it is not necessary for Man to think, as he

goes through the different acts. The action takes place without one ever having been taught to do so; it is predetermined by certain inherited nerve connections in the central nervous system. The simpler reflexes, such as the contraction of the pupil of the eye in a bright light, take place invariably, and in spite of all our best

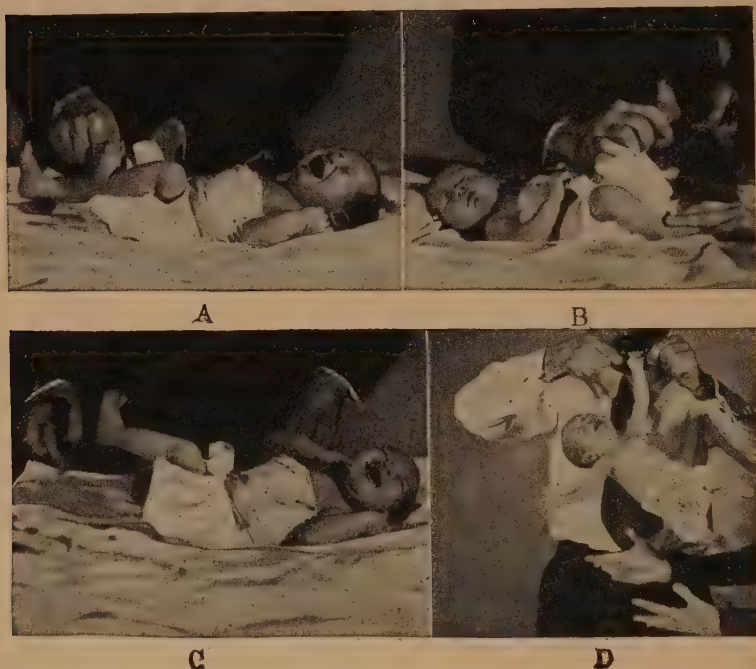


FIG. 27.—Showing some infant reflexes. A, defensive reflex with left foot to slight pinch on inner surface of right knee. B, stimulation for Babinski. The blunt end of a match is rubbed across the sole of the foot. The result is shown in C. The great toe shows extension, whereas the small toes show "fanning" or flexion. (This is a very variable reflex so far as the pattern is concerned.) D shows the grasping reflex (infant 12 days old).

efforts to stop them. The more complicated reflex movements may be brought under some voluntary control; the reflex coughing upon irritation of the throat membranes may be held off voluntarily at a musicale or during prayer. In this way, the cerebrum comes to dominate the lower nerve levels.

Reflex action is unlearned action; the simple reflex movements are determined by the connections of neurones which are

common to the race. Unless altered by disease which affects the neurone connections, reflex actions invariably take place when the proper stimulus is given. They are largely mechanical; there is no more thinking necessary for a reflex reaction than the trap needs to think when the mouse steps on the lever which sets the spring in action. One may become aware of the movement *after* it has been made, but it can take place without any control from the higher centres in the cerebrum, and oftentimes in spite of one's best efforts to avoid the action.

THE NEURONE PATTERN

Here is a case where the cards are all stacked by Nature. Certain neurone connections are apparently inborn; they are present in the individual at birth, and all they need is some sensory stimulus to set them into activity, whereupon a reflex action ensues. All these reflex actions involve the connection of neurones within the spinal cord. Some of the simpler reflexes involve only a few neurones, others that are more complicated involve larger numbers of neurone connections. The neurone connections within the central nervous system that are inborn and function in producing a certain reflex are the **neurone pattern** for that reflex. Every reflex involves a particular neurone pattern. It is quite probable, however, that a single neurone may be a part of several neurone patterns; it is not the single neurone, but the total neurone pattern, that determines the action.

It will be recalled that, within the spinal cord and cerebrum, certain neurones with common functions were grouped together to form tracts. A tract thus carries only sensory or motor or intermediary neurone fibres. A neurone pattern, on the other hand, must be composed of at least a sensory neurone and a motor neurone. As a matter of fact, a neurone pattern also probably has several intermediary neurones in addition to these.

Neurone patterns are back of the control of all behavior that is under the control of the nervous system. The simpler and inherited neurone patterns that form the basis for *invariable responses* compose the *reflex circuits* or *reflex arcs*. They control *reflex reactions*.

CORRELATION-COÖRDINATION-ASSOCIATION

A few paragraphs back, it was stated that something very significant happens to the nervous impulse after it enters the central nervous system. Exactly what this is must necessarily remain somewhat obscure. It is commonly accepted that three distinct things may occur.

First is the **correlation of the sensory impulses**. The correlation determines to what group of stimuli (objects in the world around us) we shall respond. One may be stimulated simultaneously by the shrill sound of an automobile horn and the sight of a familiar face across the street. The organization of the stimuli into "automobile" or "friend," and the determination of whichever group one responds to, depends upon correlation.

Coördination, on the other hand, is concerned with the organization of the nervous impulses, preparatory to their entering the motor neurones. This is present, to a remarkable degree, even in the lower animals. Each and every movement involves the interaction of several groups of muscles; one muscle must contract a great deal, another must contract ever so slightly, and others must not contract but actually lengthen. Some muscles must be stimulated to action; others must be **inhibited** and prevented from acting. Any disturbance in the coördinating of the nervous impulses controlling these muscles will result in an awkwardly performed act, or perhaps in the inability to perform it at all.

Correlation and coördination parts of the neurone patterns may be inherited as integral parts of the reflex arc. Or they may be modified by experience or partially acquired, in which case one has learning and the acquisition of skill. Among the lower forms of animal life the modification of these patterns by past experiences is quite negligible; Man can learn highly complicated acts and perform feats of memory; our old pantry and scullery friend, the cockroach, can do no more than perform the gigantic intellectual feat of remembering for almost half an hour!

The higher correlations of sensory impulses, where modifiability seems to be the dominant characteristic, are known as **association**.

Association occurs at a higher level in the nervous structures than does correlation; association involves intermediary neurones rather than sensory neurones. The older psychologists used to limit their study of the behavior of human beings to a study of the associations only. But in applied psychology, where one is interested in predicting and controlling behavior as well as thought, it becomes necessary to study the activities of correlation and coördination as well.

Coördination is probably the simplest of the three, and is more largely determined by inherited neurone patterns. Coördination is limited largely to the ventral regions of the spinal cord and lower part of the cerebrum; the only major exception to this is in the case of the cerebellum, which is a prominent centre for coördination. The centres for correlation and association are developed from the dorsal parts of the central nervous system. The thalamus is concerned especially with the correlation of incoming (sensory) nervous impulses; the cerebrum is the chief centre for association.

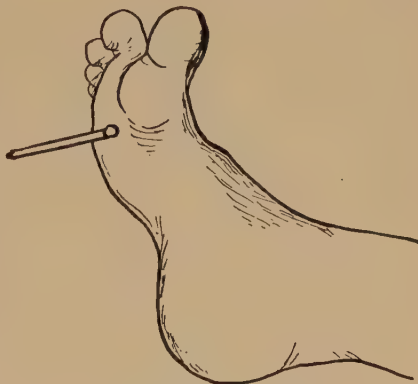


FIG. 28.—Babinski's reflex. When the sole of the foot is lightly stroked, normally all the toes are bent downward. When the great toe is extended and the others bent downward it is known as Babinski's reflex.

MODIFICATION OF THE NEURONE PATTERNS

During the life of the individual there is a waxing and waning of certain elements in the neurone patterns of even the simple reflexes. One reflex, known as Babinski's reflex, is obtained by stroking the sole of the foot lightly. In the new-born babe, this stroking brings about a bending downward of all the toes *except* the great toe. This extension of the great toe is Babinski's reflex. This is present in infants until about the sixth month. It does not

reappear in adults except in the case of diseases involving the nervous tissues! There is thus apparently some **modification of the neurone patterns** involved in reflex action taking place spontaneously.

Another way in which simple reflex behavior may become modified in the higher animals is by the formation of what are known as **conditioned reflexes**. The secretion of saliva is a reflex process. Ordinarily, the stimulus bringing about the secretion of saliva is the presence of food in the mouth. But under certain conditions, the sight of food may bring about the secretions of these glands. Even the mention of food, or thinking about a nice juicy steak, will excite the salivary glands to reflex activity. Here we have instances in which a stimulus, originally ineffective, which did not originally bring about the reflex response, has come to be effective in exciting the reflex secretion of saliva. A **substitute stimulus** has thus come to take the place of the original stimulus. This has come about by the frequent recurrence of the substitute stimulus along with the originally effective stimulus.

Through the process of substitute stimuli becoming effective, Man's unlearned supply of reactions becomes modified through his daily experiences. No fresh neurones are formed after birth. The wide range separating the behavior of the babe from that of the adult is brought about by the maturing and formation of new neurone patterns out of already existing patterns which are inherited.

The response of **fear**, for instance, has been found to be elicited ordinarily in the native state only by a very few stimuli. Fear is undoubtedly inherited, along with Man's other unlearned responses; but what one comes to fear is largely a matter of substituting of stimuli; naturally neutral and ineffective stimuli come to be capable of arousing the organism to fear. Just what these substitute stimuli are depends very much upon one's past experiences. One child may become fearful during a thunder storm, through the attitudes of his elders; another may become afraid of dogs, after being hurt by an overly friendly dog. The fear of the dark has a substituted stimulus.

RETURNING GOOD FOR EVIL

It is characteristic of conditioned reflexes that conditioned stimuli may be rendered ineffective through training. Many foolish fears may also be transformed into more normal responses by substituting another response to the situation which brings out the fear. A young child, for example, had had a fear of horses conditioned through a series of unfortunate events. The sight of a horse served to throw the child into a fit of terror. The parents realized that this was an unhealthy response. So they presented the child with muslin books rich in illustrations of horses. Interesting stories were told about these horses; the boy was told how the horses helped the farmer and how the farmer's boy rode the horses to water. Then a nearby fire house was visited, the span of beautiful, pure white horses admired. And the conditioned response of fear gave way to the request to be placed on Snowball's back!



FIG. 29.—A conditioned response. A homesick patient in a hospital. There has been a serious failure in using psychology when such a condition is reached as this. Crile, *Origin and Nature of Emotion*, W. B. Saunders Company.

This simple case illustrates the mechanism at work in many of the unnatural responses of daily life. This one was fortunate in nipping in the bud, as it were, a conditioned response which might have been carried through into adult life when its eradication would

have been a difficult and trying task. Many instances of fear of the dark, of high buildings, of long bridges, of the open water, of certain types of people are essentially the same as Buddy's fear of horses. If properly attacked these petty troubles can be overcome, just as Buddy is now eager with joy at the approach of horses.

It is quite common for patients to manifest an exaggerated series of natural responses during illness or while in the hospital. Under slight provocation, extremes of conditioned responses may be called forth by ordinarily neutral stimuli. Substitute responses should be promptly and persistently cultivated. How this may best be accomplished will be the topic of the following chapters.

In the last five chapters we have developed a foundation for the comprehension of behavior in mankind. The subject of the remaining portions of this book will deal with the application of these foundations to the prediction and control of behavior.

TOPICS FOR DISCUSSION

1. Which of the following are reflex actions:
 - (a) squinting in a bright light?
 - (b) dodging when someone calls out "duck"?
 - (c) screaming when a mouse is sighted?
 - (d) regurgitating food when the throat is tickled?
 - (e) shivering when cold?
2. Are reflex actions due to the past behavior history of the race or the individual?
3. In learning to read music is it correlation or coördination patterns that are modified?
4. Examine into some of your fears. Can you find the incident in your past behavior history that is responsible for the conditioned response of fear?

PART III
APPLICATIONS

CHAPTER VIII

GAINING SKILLS

Racial and Individual Determinants of Behavior—The Kinds of Skills—The Values of Habits—The Pitfalls of Habits—The Gaining of Skills—Eliminating Useless Movements—The Plateau of Despond—Periods of Practice—The Value of Incentives—Enslaved to the Eyes.

ALL living animals enter upon life with scores of actions which are entirely unlearned ; such inherited ways of responding are found in the reflexes, instincts, and emotions. The neurone patterns determining these are a record of the **past behavior history of the race**. The complicated activities of the adult animal have been built up out of this mass of unlearned actions. These unlearned activities become modified by the **past behavior history of the individual**. The lower animals, such as the earthworm or the butterfly, never add much to their stock of unlearned activities. Man and the higher animals possess rather pliable nervous structures which make possible the modification of these unlearned acts. This is made possible through the prominence of intermediary neurones in the higher animals. But, even in Man, it has been conservatively estimated that about eighty per cent. of his behavior is unlearned. The remaining twenty per cent. is little more than a modification, by experience, of certain inherited modes of response.

Although the bulk of Man's actions may be unlearned, nevertheless the actions that are acquired are very important. Language, skill, dressing and whole myriads of the activities of daily life are acquired. The education of an individual consists in the modification of unlearned forms of action; the training of a nurse is accomplished by a modification of existing forms of responses; the rehabilitation of the wounded soldier, or of the amputation case, is accomplished through a modification of old forms of responses. All

matter in the universe is modified by its past experiences. The large boulder is split into halves, or even fragments, by the accumulation of the influences of frost, wind, and cold. A chemical solution has slightly different properties after an electrical current has been passed through it. A sheet of paper which has once been creased carries the mark of the stress through its life.

Living tissue, as well as the non-living, is modified to a very marked degree by the experiences to which it has been subjected. Brushing regularly will train the hair to lie in a desired fashion. Continued use of the muscles of the arm brings about certain changes.

Among the tissues of the body, the nervous tissues are especially modifiable by past experiences. A certain movement, which may have originally been purely accidental, will be repeated later because of the modification in the neurones during the first activity. Or a response, which is entirely unlearned, may come to be brought about by a situation which was originally ineffective. The fear which was experienced when one's arms were held by a certain person, may be aroused again upon sight of that person. The stimulus has come to set off a certain inherited response through previous experiences.

KINDS OF SKILLS

This modification of the neurone patterns which control acts is the basis for **learning**, the formation of **skills**, and the acquirement of **habits**. Habits are thus seen to be something other than is usually associated with the word. Smoking, drinking, and swearing are frequently thought of as the habits of the unspeakable male. True, they are habits, and delicious ones; but they are very poor examples of the place of habits in daily life. Every activity which is repeated tends to become habitual. Each person has his own habitual method of holding a pen or of crossing his "t's." Certain habitual orders are followed in donning clothing; one must sit on the bed to lace the shoes; the same act seems difficult while sitting on the floor. The expert typist and the artist at the piano

have become so through habit formation. The skilled surgeon and the nurse efficient in bandaging have reached their skill through the formation of habits.

There are also habits of thought. The words "each and" bring to mind the word "every." "In spite" naturally is followed in thought by "of." These are learned responses of thought that are also habitual in their action. Certain types of experiences make for careless habits of thought; other experiences may cultivate careful habits of thought.

In chapter seven it was found that the integrating activities of the central nervous system could be divided into three groups: habit formation may also conveniently be grouped in a like manner. First of all, there are **habits of coördination**; these are concerned primarily with skill in using the muscles. The baseball pitcher, the skilled typist, part of the operative technic of the surgeon are made possible through the formation of certain habits of coördination. **Habits of correlation** are found in the reactions to groups of stimuli which are largely developed through experience. Reading is a good example of this; first one reads by letters, as taught in the early grades a few years ago; a little later, one spontaneously came to read by words; and later as maturity and habits of correlation were developed whole phrases were read with the same ease that the primary pupil reads letters. Certain stereotyped ways of thinking are brought about by **habits of association**. When a man is run down by an automobile in the street, the physician thinks of it as an emergency case; the priest thinks of it as a case for absolution; and the shyster lawyer sees an opportunity to obtain a client. These differences in points of view are not inherited, they are due to the past behavior history of the individuals, which has led to the formation of habits of association.

VALUE OF HABITS

All in all, habit is very prominent in daily activities. And it is also very useful. Habits make for economy; a habitual act can be performed in **less time** than a non-habitual act of the same com-

plexity. *Habits make individuals consistent*; through habits one always tends to react in the same way under the same situations. *One can predict* his friends' *behavior more accurately* from an acquaintance with their habits. *Habits also make for accuracy.* Before you had formed the habit of playing the piano what an amount of discords you produced. And before the stenographer had formed her habits of manipulating the typewriter how many errors her letters contained. *Habitual acts can also be performed with less thought* than is necessary to perform the same acts before they came to be habitual. When the child is practising its music lesson, it concentrates its attention on every note and every movement of its fingers. But now, perhaps, the same individual can play a new piece of music and carry on a light conversation at the same time. There's the economy of habit for you! The first roller bandage was as laboriously applied as it was bunglesome; you chewed your tongue and strained your imagination to figure out which way to go next, now it comes almost by second nature. This change is brought about by repetition of the action until it comes to be performed habitually.

DANGERS IN HABIT

Habits are of great service to the organism. Danger also lurks in them. It has been said that habits are at once a bane and a blessing, our best friend and our worst enemy. Of course, it depends partly upon what sort of habits one forms. Some habits are considered as naturally bad. We shall not spend much time on bad habits. The chief concern we should have with them is to prevent their formation in ourselves and our patients. Every time an undesirable or pernicious act is performed, it should bring some **unpleasant result** so it will not be repeated. Acts that bring pleasurable or satisfactory results are repeated, habits become formed through this **repetition**. As a general rule unpleasurable or painful results bring about the opposite effect. **Habits begin** their development a few hours after birth. Therefore, the nurse and the physician must guard the formation of habits, even in the nursery.

The infant that "cries its head off" for attention will do the same stunt the next time it feels lonely, if it got what it was looking for the first time. The parents who must walk the floor with a baby nights have their own methods of habit formation to blame—or perhaps a nurse who started it all.

Undesirable actions on the part of adult patients should be prevented from becoming habits by the same method. Habits of association, as well as of coördination, must be guarded in the patient. A moderately long sojourn in a hospital without any responsibility, with habits of expecting to be waited upon, leads to what has been called **hospitalization**. The patient has innumerable habits formed incidental to the administration and routine of a hospital, which are not useful outside in the daily life of the world. Through habits of association he comes to think that he need not work; as long as he has a few vague aches and pains he may remain in this ward environment, free from all of the rebuffs of the actual world.

Another danger in habits, aside from habits that have undesirable activities connected with them, is in the fact that habitual actions are performed with a **minimum of attention**. The nurse who is changing a dressing for the "steenth" time may overlook significant changes, just because the act has become habitual and attention is at a minimum. The wrong dose of medicine is frequently administered because of this waning of attention. The remedy for this is obvious. In positions involving the responsibility of the physician and the nurse it becomes vital to bring more attention to these habitual acts than is usual. I know a physician who took pride in stating that in his two-hundredth case of tonsillectomy he would be able to perform the operation with his eyes closed, purely out of habit. He tried to "clip" his two-hundredth and first case with his eyes shut, but he had to open them and work in earnest to save the patient's life within a few minutes! A person may be able to play the piano with his attention on the conversation, but that only spoils the artistry of the music and usually cheapens the conversation also. One may hazard this with pianos and conversation, but not with patients, where even the smallest detail may bring about an avalanche of consequences.

THE GAINING OF SKILLS

The progress of the nurse and the physician in their profession depend to a large extent upon their adeptness in acquiring skill—forming habits. Many patients have to be taught to use parts formerly unused, or old parts have to be taught new activities before the patient is ready to be discharged into the world. Certain aids to the efficient formation of habits known to the psychologist would undoubtedly be of value to the physician and the nurse.

New activities are learned better when the individual himself is active. Having some one put your hands through the movements is not nearly so effective as doing it actively yourself. The school child gains but little skill in coördination when the teacher guides his hand in writing letters. Observing the movements of another is a great aid, but **be active** when you perform the desired act! Whenever possible have the orthopedic patient move his own limbs; do not move them for him. Learning is much more rapid when one is active than when one is passive. There is a **cross-training** in habits involving the movement of limbs primarily. Thus the patient is hastened along in the use of the untrained limb if the healthy limb is put through the movement a few times first.

This *cross-training* is very limited. It usually carries over only for the same identical acts. The question of **formal training** must also be answered largely in the negative. Learning some movements very accurately does not bring about a general increase in skilful movements. The only other movements that will be improved are those that have some neurones of their neurone pattern in common with the act that has become skilled. Learning to shave a gallon bottle helps in shaving a patient for the first time; this is because the two acts have certain common elements in their neurone patterns. Much more efficient progress in barbering would be made by performing the same amount of practice on the patients—but it would probably be harder on them than on the much-suffering bottle. The only way to be sure of skilful manipulation in a given task is to **practise that act itself**, not to depend upon some transfer from a somewhat similar act.

USELESS MOVEMENTS

Progress in habit formation consists largely in **eliminating useless movements at first**. The child learning to write in school chews his tongue, rolls his eyes, cranes his neck, and acts in a generally grotesque manner while attempting to form the habits essential to writing. Gradually, these useless movements are dropped in a rather spontaneous way. The intelligent adult can make an analysis of the essential movements involved in an act beforehand. Then he can check himself up to see that these useless

movements are eliminated as speedily as possible. This intelligent analysis will increase the acquisition of skills by leaps and bounds. What may be accomplished by the elimination of unnecessary movements may be



FIG. 30.—Practice makes perfect, but not by increasing the speed of movements. These drawings show the actual movements made by the arm of a person in manipulating a drill press. The one to the left shows the movements while the worker was unskilled. Each drawing to the right shows increasing skill. The useless movements are gradually eliminated. Study of the movements before starting the work will avoid extravagant losses.

intimated from a study of the laying of brick. For century upon century bricklayers had been plying their trade, apparently at the highest level of efficiency which could be expected. But along came a man in the early part of the twentieth century and applied psychological methods to the art of bricklaying. He found that bricks could be laid with a minimum of five movements, rather than eighteen; as a result, the output of the average bricklayer was trebled. The bricklayers do not work any harder, but they work **more efficiently**.

This elimination of useless and roundabout movements is very important. Progress in becoming skilled in coordination does not necessarily mean that the *speed* of the movement is increased. It is efficient performance rather than speedy performance. As one learns without any intentional guidance, oftentimes entirely new movements are spontaneously used and retained in place of former movements.

As a rule habits of coördination are formed easier than habits of correlation. In learning telegraphy, for example, the operator becomes proficient in sending much sooner than he does in receiving messages. Correlation and association need more practice and care than does coördination, if the same degree of efficiency is to be reached.

THE PLATEAU OF DESPOND

Ordinarily one does not learn at an even rate: this is oftentimes discouraging. It is rather disheartening to be plugging along

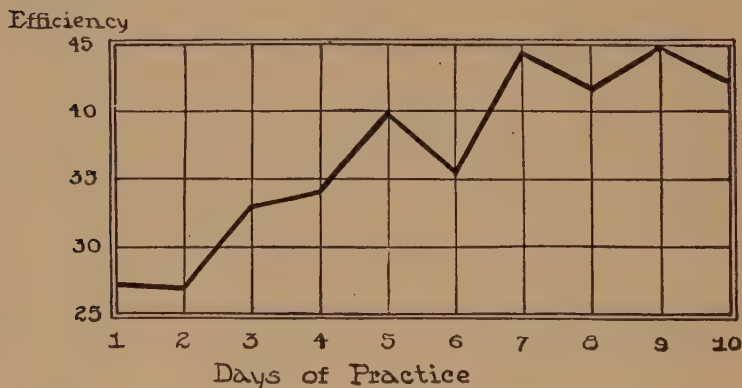


FIG. 31.—How does one become skilled? This chart which is an actual record answers this question. Skill is not gained at an even rate. The progress of this person is typical of all learning. Notice that some days there is a loss.

and know that no progress is really being made. Studies of the progress of learning (habit formation) in such activities as shooting at a mark, learning the telegraph code, and typewriting, show that **progress is not even**. Some days progress is rapid, others it is just dragging along, other days there may actually be a falling off in accomplishment. It is usually characteristic of the formation of habits of skill or learning that these periods of no progress last for some few days. These periods of no progress are called **plateaus**, because the chart of accomplishment is flat, like a plateau, during this period. Everyone experiences these plateaus in learning; they should not be disheartening. They may be caused by a

temporary slump in interest, or—strange as it may seem—by **too frequent practice**. In experimental work, where these plateaus have been taken as a challenge and the observer bent his best efforts to overcome the period of no progress, the plateau gave way to progress. Looking upon the plateau as a **challenge to work** all the harder is thus found to be a wholesome and effective policy. It is the challenge of the impossible which proves that it can be done. As the master surgeon said, when told by the interne that it could not be done. “Yes: but if we do not watch out, some chiropractor will come along and do that very thing!”

PRACTICE PERIODS

The rate and efficiency at which habits are formed depends upon the way in which the practice is distributed. The lazy man's way has been proved by experiment to be a pretty good way after all. Do not try to do it all at once. That is the secret. It is much better to **distribute the practice** rather than to practise for long periods at a time. A few minutes of concentrated effort every day is much better than to plug away for several hours for only a day or two.

Perhaps a close relative of the “plateau of despond” is the decreased rate in improvement as practice progresses. Progress in the formation of habits is rapid at first, then it gradually fades off until it requires long continued utilization of the skill to bring about a small improvement. This **diminishing of returns** is common to all learning. As one becomes proficient he approaches the limit of his natural ability in the activity under consideration. Of course, there are **individual differences** in the various skills, as well as in other characteristics. Not everyone can be an artist at the piano. As this limit of one's abilities is reached, the effect of practice upon improvement becomes less and less.

It is an old maxim that one should make haste slowly. This might be paraphrased to the effect that if one wants to acquire the best skills he should acquire them **one at a time**. If only a few

habits are being formed at one time they are formed much more quickly. When the learning is complicated by more habits it becomes increasingly more difficult, and probably less efficient. One thing at a time and that done well, applies to the formation of habits, as well as to their use. Psychology is all for the lazy man; only a few at a time, and only practise for a few minutes.

When it comes to learning, such as is involved in memorizing a few stanzas of poetry or the symptom complex of a disease, it is

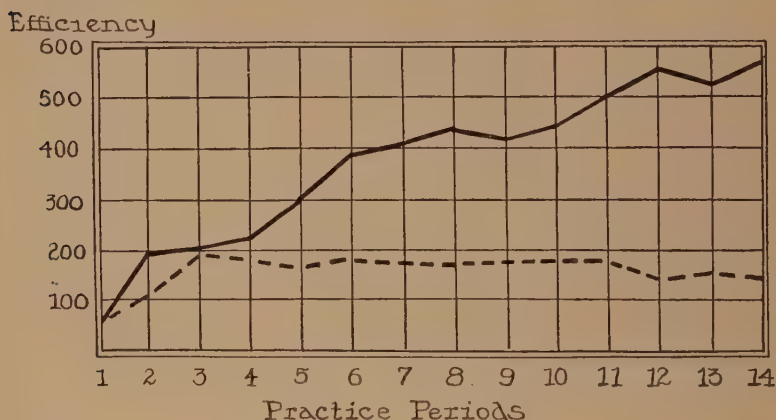


FIG. 32.—*Shall I practise a whole lot on one day or a little on several days?* This chart contains the answer. Two records are given. Both represent seven hours of practice. The dotted line shows the gaining of skill when fourteen practice periods of one half hour each were used in *one day*. The solid line shows the much more efficient gain in skill when the same fourteen periods were distributed over fourteen days. Each curve on the chart represents the same amount of time, but *look at the difference in efficiency*.

best to learn the whole thing as a unit. No single stanzas or single items should be memorized and then others taken up in their turn. Most efficient memorizing is done by taking the material as a *unit* and **memorizing it all**. Apparently, this is not in favor of the lazy man; but in the long run, it makes for least work and effort.

VALUE OF INCENTIVES

Habits of skill and thinking are best formed when there is some **incentive**. Prizes may be offered as incentives; an appeal to the pride of accomplishment may be an alluring bait to spur the worker

on to better accomplishments. Orthopedic patients may be urged to do their best through **rivalry**; or the patient may be motivated by attempting to **beat yesterday's achievements**. The keener the individual feels the incentive, the more rapidly is the habit formation accomplished. Faint heart never wins here! Discouragement should never be practised. The cry should be *on! on!!* And not



Courtesy of Dr. B. T. Baldwin.

FIG. 33.—Use of constructive proclivities in providing motivation for orthopedic exercise.

on! just for competition with one's neighbors, but for some practical good, if possible. Perhaps the strongest incentive there is, is to learn something that will be worth while: something that is of **value for the daily tasks of life**. One may have to go to Mars and back at times to find any practical usefulness, but it should be there. This is why patients progress more rapidly in rehabilitative work when they are brought into the use of mutilated limbs through occupational therapy rather than through rather far-fetched gymnastic exercises. Physically, the gymnastic exercises might be more

appropriate on the surface; but they neglect one big factor—the interest of the patient. The patient's interest can be aroused better by making wireless coils than by exercising with dumb-bells.

We found that the most efficient way to form habits is one at a time. When it comes to exercising them, we find the same rule to hold—one at a time. When two or more habits are brought into play at the same time, there is a conflict of results. One may have perfect habits of conversation and piano playing; but when exercised simultaneously neither one is up to the usual standard. A long period of practice in exercising these habits simultaneously may lead to the formation of skill in exercising them in this way. Ordinarily there is an **interference of two habits**. Even when the operative skill of the surgeon has reached a degree of development, it is unwise for him to recite the alphabet or talk politics during a major operation. The nurse in the sick-room is also incapable of exercising two habits at the same time and doing her tasks well; for fine, accurate work, one thing at a time.

SLAVERY BY THE EYES

Some physicians and surgeons say they want nurses for extra hands. Oftentimes the nurse herself wishes she had an extra hand to use in a difficult manipulation. Psychology has something to offer them in the way of a better use of their two hands. This is to be accomplished by **freeing their hands from the bondage of their eyes**. The muscles of the body are supplied with two sets of nerves. One set contains the motor neurones; stimulation by these neurones brings about a contraction of the muscle or an inhibitive activity, as the case may be. The other set of neurones is sensory in function. They do not carry impulses to the muscle but to the central nervous system. Every time the muscle contracts, these sensory nerve endings are stimulated, informing the central nervous system of the condition of the muscle. It is not necessary for the eye to check up on the movements of the hands or of the fingers. Innumerable acts can be learned without any aid from the eyes. Think of the

blind man; and still most people are slaves to their eyes! They need not be. The muscles have their own eyes in these sensory endings. The skilled typist never looks at her fingers or the keyboard; the skilled pianist looks only at the notes on the sheet of music. The physician and the nurse can gain the use of an extra pair of eyes by learning to perform all possible actions without being enslaved to sight. For many simpler acts, the fingers and arms are sufficient in themselves; the eyes can be kept free for other uses.

TOPICS FOR DISCUSSION

1. Do children learn to walk or is it unlearned action? How about the flight or the song of birds?
2. Do you read by words or by letters? Try reading letter by letter and see if your rate of reading is slowed up. Then see if you can take in a whole word or a whole phrase at a single glance.
3. Can all people become equally skilled with the same identical practice? Would years of proper practice gain your entry into grand opera?
4. Do pupils under a pleasant teacher who rewards them with a smile or a kind word learn more than they would under a grouchy teacher who gives a severe tongue lashing for every mistake? How would you apply this same principle in nursing?
5. Make a study of the preparation of a hypo. How many useless movements can you do away with?
6. When in the operating room make a study of the way in which to hand sutures and instruments and pads to the surgeon so he can proceed to use them with the absolute minimum of movements.
7. What incentive makes you work hardest in becoming a trained nurse? Do you use this incentive when you are at a plateau of despond?
8. How many routine tasks of nursing can you do without the aid of your hands? How many do you do? Is it safe in nursing always to do away with the bondage of vision when it is possible?

CHAPTER IX

SKILL IN THOUGHT

**What Thought is—The Materials for Thought—Memory and Thought
—Aids to a Better Memory—How to Practise—What
Aids Should be Used.**

SKILLS in coördination and correlation may be improved. They are not inherited, as are the reflexes and instincts and emotions; they are learned by the organism repeating the same activity several times. Skill in association, or what we will call thought for the time being, is also not inherited but largely acquired. What we think is a result of what we have done; **thinking depends upon the past behavior history of the individual.** Skill in thinking may be improved, just as skill in movements may be improved; again, it is the psychologist who tells how it is to be done.

Just what do we mean by skill in thought? Before this can be answered we must state what is meant by thought. This is a word that is used very commonly in daily speech. It is used very broadly and very loosely. There is no doubt that much that is called thinking scarcely deserves the dignity of the term. In this chapter we will use the term in a narrower and more specific sense. We will not use it for what may be called **passive thinking**, such as goes on in day-dreaming or building castles in the air. This passive thinking is probably what a person has in mind when he offers you "a penny for your thoughts"; he scarcely risks more than a penny, for he might strike a poor bargain with passive thinking.

Active thinking is much different. Here we do not have a passive and apparently disconnected flow of mental pictures. The stores of past experience are called upon for certain definite contributions in the present situation. There is a problem to be met, perhaps an emergency case. Hastily, one recalls certain similar

cases in the past, general rules for hemorrhages are recalled, what to do with this present case is decided as quickly as possible. Then one does what his thought has indicated as the best procedure. This is much different from the thinking of the day-dreamer, who is building his "castles in Spain" in a rather undirected manner. Active thinking, it will be noted, usually leads to some overt action; active thinking becomes most prominent when there is something to be done, especially when what is to be done is not something of an habitual sort. It is the new activities that challenge our store of skills and precipitate active thinking. It is the active thinking with which we will be concerned chiefly in this present chapter. Passive thinking will be a topic included in a later chapter.

Active thinking leads to facts that cannot be directly observed. Newton's laws of gravitation were the result of active thinking. They could not be observed directly. There is something which we want that cannot be seen directly. There is some uncertainty, some doubt as to what to do or what to diagnose. Active thinking results when one is not certain what to do in a situation. Then a hurry call is sent to the past experiences of the individual that he may think out the best way of acting.

MATERIALS FOR THOUGHT

The materials for thought are the **retained past experiences** of the individual. Not every past experience is retained. Many are forgotten and pass the way of all flesh. But some are retained; these furnish the chief materials with which we think. The anatomy which we remember is used if the emergency case is to be an amputation patient. If the knowledge of anatomy has slipped into oblivion, thinking is less skilled and efficient. The materials for thought are usually stored up in the form of language; we think in words, not general and vague "pure thoughts." Our anatomical thinking is with the aid of words; our *materia medica* is stored up in the form of words.

Skill in thinking is, therefore, dependent very largely upon two things: **language** and **memory**. The thinker is not simply the

person who knows half the dictionary—knowing half the dictionary in itself makes for more skilled thinking. A good command of words is, perhaps, more of a tool for thought than it is the symptom of thought. But language itself depends upon learning, upon past experiences. One of the first aids to skill in thinking, therefore, is the retention of past experiences in a serviceable form.

MEMORY AND THOUGHT

Memories are not inborn, but the capacity to remember is. No ideas or thoughts are present at birth: they are acquired through the experience of the individual. This new experience is retained, probably, through a modification of neurone patterns by use. No new neurones are formed after birth, only the connections and constitution of Nature's original endowment are modified. This is how the past experiences are retained.

Memory would thus be expected to depend somewhat upon what might be called the **plasticity of nervous tissue**. This varies through life's different epochs. The child remembers more experiences than does the adult. The person in old age has a notoriously poor memory for recent events. Happenings of the old person's childhood can be recalled in detail but whether or not he ate half an hour ago he does not remember. This so-called plasticity also varies from individual to individual. Not everyone is endowed with abilities to remember to the *n*th degree. Some naturally have better retention for past experiences than do others. But at that, it is probably true that very few people indeed are making the most of their natural abilities in this memorizing. No matter how good or how poor you may think you remember, you can increase your proficiency in this several fold by following certain rules determined by experimental psychology.

For our present purposes we may distinguish two kinds of memory. The one is **immediate memory**. This, as the name implies, is memory for a few moments only. This is the kind of memory that the official introducer at the White House has. He

must remember the guest's name long enough to announce it to the President. Then since there will be no more use for the name, it may be promptly forgotten.

Opposed to immediate memory is **delayed memory**, or lasting memory. The hotel clerk must remember the guest's face and name for a few days. The medical student hopes to remember his pathology the remainder of his life. This is delayed or permanent memory. Delayed memory is the kind that is of most service in the formation of skill in thought. Delayed memories are retained and used when we make use of the multiplication table which we learned in the grades. Remembering the physician's orders from day to day is, perhaps, on the borderline between immediate and delayed. It is sometimes difficult to distinguish them absolutely. But, as a rule, it is the delayed memories that are of most service in active thinking.

AIDS TO A BETTER MEMORY

Improving your memory is the first step toward improvement in thought. The first essential of a clear memory is a **clear impression** of what is to be remembered. This is accomplished by limiting the attention to the thing to be remembered. Scatter-brained observations give the basis for scatter-brained thoughts. Clearness of impression means attending to one thing at a time. When observing the patient's pulse attend only to that. In studying *materia medica* go slowly enough to catch each word and every meaning and use clearly. Clearness of impression is not compatible with hasty, superficial reading. Go slow—you really make more speed in the long run.

Have you ever been introduced to some one at a social gathering and racked your brain the next moment to recall his name? Not even an immediate memory of it! And what was the reason? You were, perhaps, a bit fussed when being presented, were you not? If you had been cool-headed and deliberate the name might have stuck with you better. And then, perhaps, you were giving more attention to a lodge pin, or the hair-dress, or a necklace, than you

were to the name. For the time being the name is the important thing; you should have given your attention entirely to that.

Now, in place of being introduced to some one at a social gathering, substitute, say our old friend *materia medica* for the Miss What-is-her-name to whom you were introduced. The same rules apply to remembering the driest subject that do for remembering the name of the loveliest person in the world.

That is not all. Clearness of the initial impression is only the first step. Let us go back to the social gathering again and see what can be done to make certain of a better retention of the elusive name. What do you say when you are introduced to someone? Feel sort of foolish usually, don't you? And you mumble something or other about glad to meet you, lovely evening, I have heard so-o-o much about you. Is that really helping you to remember the name so they can be presented to your friends without embarrassment later? Not a bit of it.

Here is what should be done. Why not mention the name in the first sentence? Then you have not merely heard it, but you have said it. You not merely understood it, you have shown that you can *use* it. And that is what memories are for, *to use*. Go out of your way, if necessary, to mention the name. It will pay, if you want to have a serviceable memory of it. Do the same thing with your *materia medica*; do not simply look at the long, strange-appearing words, *pronounce* them, read their uses and doses of the items *aloud*. By so doing, the initial impression is *reinforced*. Two sensory channels are called into play, the originally clear impression becomes more firmly impressed in the neurone patterns by being reinforced. Two people can carry a heavier load than one; a double impression lasts longer than a single one. Double your impressions by using your eyes and ears.

Another way of reinforcing the impression is by writing the things to be remembered. Experiments have demonstrated that this reinforcement is not the most efficient. The eye and ear is better. Anyway, you are going to be called upon to use the memories through the eye and ear rather than the hand. You write them only

at examination time. The remainder of the time you talk about them or read them or think about them. Make the impression in the way in which you expect to be called upon to use it. You will recall that in chapter eight it was stated that training in one sort of skilled movement did not mean great improvement in other skills; each one has to be practised as it will be used if it is to be most efficient.

Repetition is the next step in the fixing of the impression into the acquired neurone patterns. Repeating Miss What-is-her-name's name over several times in the course of the conversation serves the purpose of repetition. Reading the *materia medica* over several times gives repetition. But the most efficient repetition should be distributed in a certain very definitely proven way.

HOW TO PRACTISE

Repetition makes for delayed memory. It serves to offset forgetting. It works most efficiently when it is distributed so as to overcome the fading of memories. Experimental studies have shown that the memories fade most rapidly at first. You forget more within an hour after reading than you do within a day following this hour. This rate of forgetting is pictured in the **curve of forgetting**. This illustrates plainly how we forget most rapidly at first. Then the rate of forgetting becomes gradually slower, until at last a fairly stable level is reached. This is what is usually retained. The high point of the curve represents the immediate memory we had in anatomy. The low point at the right end shows how much is retained permanently.

The lesson to be drawn from this is obvious. Practice should be greatest the first few days. Repetition of the facts retained should be practised most frequently at first to offset the loss due to forgetting. The first day, the lesson should be repeated say five times; three times the next day, once the day after that, and then recalled every other day for a few days. It is a waste of energy to do all the repeating the first day. **Distribute your practice**, review a little each day.

The test of the pudding is in the eating. The test of a memory is in the using. Retention is of no value if it is not possible to recall the facts impressed. It is not sufficient merely to have the

past events firmly and clearly impressed. It must be possible to recall them readily when they are wanted for use. This is to be gained in two chief ways.

First of all, recall itself depends upon **practice in recall**. The more practice in recall, the quicker and surer the recall. Here we have the old question of formal discipline again, which will be recalled from chapter eight. **General training is largely a myth**. Recall, use of memory, is not increased a great deal by training in impression. There must be training in expression or recall. The way to practise for a speech is to say it, putting in gestures and

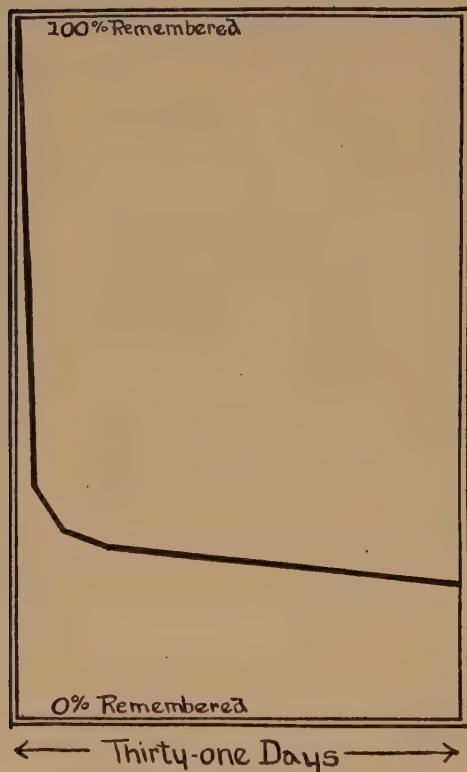


FIG. 34.—How we forget. Over sixty per cent. of what one learns one day is forgotten two days later. But from then on forgetting proceeds slowly.

everything, not merely thinking it to yourself. The way to practise recall is to recall. Things worth remembering should be recalled from time to time, past experiences should be lived over, pages of *materia medica* recited on rainy half-hours. Think about the things which you will use, think about remote things, for frequently it is

the least expected that is needed. And think actively, not passively, for all this skill is being acquired for active thought.

The ability to recall past experiences at some future time is also facilitated by having the memory materials **associated** with others. When you meet Miss What-is-her-name you may stimu-

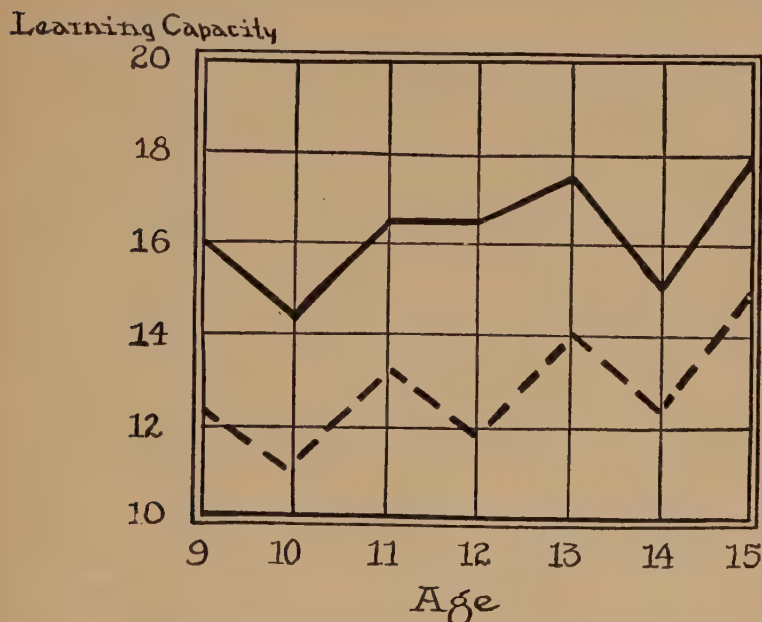


FIG. 35.—All people cannot learn with equal ease. The solid line is an actual record of the learning capacity of a group of white boys from ages 9 to 15. The dotted line shows the learning capacity for a group of negro boys of the same age. Not all white boys have the same learning capacity, some learn as slowly as the negro boys. It will also be noticed that the learning capacity varies with age.

late the conversation by inquiring if she is related to the What-are-their-names of your home town. Whether she is or not, you are getting her associated with other past experiences which are stored away in your neurone patterns. Do the same with all your past experiences. It is the "that reminds me" idea. One activity suggests another, and it usually suggests activities with which it has been associated in the past. Recall is facilitated by having a

dozen strings, rather than one, with which to draw upon past experiences. A more serviceable memory of *belladonna* will be had if it is associated with "beautiful lady"—dilated pupils—atropine. **Linking one memory up with another** in recall and in original impression adds immensely to the final serviceability of all the retained experiences.

WHAT AIDS SHALL I USE?

We have given several aids to more skill in memory. You may be thinking: "Which one of these is the best?" And the reply must be that **they are all the best**. A serviceable memory cannot be had with only one or two of the steps being used. It is safer to put one's eggs in several baskets, if a rocky road is being traversed. And a really serviceable memory cannot be had with the use of only one or two of these aids. They should all be consciously used until they become second nature, that is, until they become an habitual procedure.

Regardless of your own estimation of your skill in retaining and recalling previous experiences, this skill can be increased vastly by a little conscientious endeavor along the lines suggested. Thought rules the world; a strong back with a weakly functioning intellect accomplishes nothing. Skilled strength directed with skilled thought moves the world; skilled strength alone moves merely boulders and small parts of the world. Our present activities can be directed in an intelligent and effective manner only as they are brought into relation with our past activities. Improvement in this is yours for the striving. It is worth the endeavor. Go after it! And do not be slovenly about it. Start in now by applying the principles of this chapter to remembering this chapter. Then make use of these principles.

TOPICS FOR DISCUSSION

1. Did Pasteur make his discoveries with the aid of active or passive thinking?
2. Are human beings born with certain ideas innate in their head, such as ideas of honesty, justice, God, and so on?
3. When taking a pulse, do you want an immediate or a delayed memory of the reading?
4. Does using a dictionary on obscure words add clearness? What other steps in memory cultivation does this add?
5. Do you review your lessons a little each day or wait until just before examinations? Which is the more efficient way?
6. Recall the dangers of habit. Should one practise recall in the operating room when some habitual technic is being followed?
7. Does thinking ability increase with thinking practice?
8. Make a list of the things in addition to just doing the same thing over and over again that make perfect? How many of them are you using?

CHAPTER X

USING SKILLS

Efficiency Rate—Fatigue—Hours of Work—The Importance of Rest—
A Sermon in the Heart—Monotony—Drugs and Efficiency.

THE rate at which one works varies from hour to hour during the day. This is a commonplace observation. During one hour of the day much more may be accomplished than at a later hour under different conditions. There are certain factors which affect the efficient use of skills. It is well to be familiar with these and to take advantage of them. Accomplishing the same amount of work with less effort and time may sound like an exaggeration but it is a *bona fide* possibility.

The course of efficiency is very irregular. It varies not only from hour to hour, but from minute to minute. One's efficiency is usually less after having worked several hours, however. The abilities in using skill fall off during the day's work. The longer one works, the less results are being obtained for the time and effort that is being expended. This loss in efficiency is not due to the time of day so much as to the hours one has already been at work. This loss of efficiency is found both in continued mental and physical work, if they can really be divided. The laborer in the street, who works mainly with his arms and shoulders, suffers a loss in efficiency as the hours of work progress. The lawyer in his office who does mainly "head" work experiences a similar loss in efficiency.

Fatigue is at the basis of the loss in efficiency. The exact nature of fatigue, however, is still to be determined. It is a loss in efficiency which can be regained under certain conditions such as rest or sleep. It is important that this efficiency can be *regained*. Fatigue, probably, is of great biological value. It is not exhaustion, but it prevents exhaustion. The person who becomes fatigued halts

his work and recuperates before exhaustion comes. Fatigue is the great preventive of severe wear and tear on the organism through its continued activity.

Some fatigue may be caused by the condition of the organism itself after long continued activity; by-products of metabolism have to be taken care of, the chemical constitution of exercising muscle is altered. But, in the laboratory, isolated muscle fibres can be stimulated almost indefinitely without suffering fatigue effects. Isolated nerve fibres may also be stimulated time upon time with but little indication of a loss in efficiency. When nerve and muscle are combined in the living organism, however, things are different. The marked effects of fatigue in the living organism may be due to the connections between muscle and neurone, and between neurone and neurone. The synapse between neurones, and the end-plate between neurone and muscle, are perhaps the parts most vulnerable to fatigue.

The biological basis for fatigue is also indicated in the feelings of the worker as the day progresses. One feels fatigued, becoming bored with continued activity much more rapidly than the efficiency in the work is actually lost. The mental states are more exaggerated than the actual loss in productivity. This has its protective value; the work is laid aside and recreation sought before any actual damage is done to the organism. The mental states may also account for the irregular losses in efficiency. If purely physiological causes were behind the fatigue, one would expect a regular loss. But, apparently, the efficiency is affected largely by changing attitudes and interests in the work as the hours pass. Surely it cannot be due to physical exhaustion, for the fatigued worker will return home and labor in the garden until the shadows disappear in the falling dusk.

HOURS OF WORK

Much work has been done by psychologists in various industries in adjusting working hours, rest periods, and general working conditions, so that a maximum amount might be accomplished with a minimum of effort. The length of the working day has much to

do with efficiency. The loss in efficiency increases during the working day. Increased inefficiency and fatigue is indicated by an increase in accidents. Experiments among the women workers in a British munitions plant show the effects of the length of the working day. Under the pressing need for munitions, the working day was increased from ten to twelve hours. The immediate

Efficiency

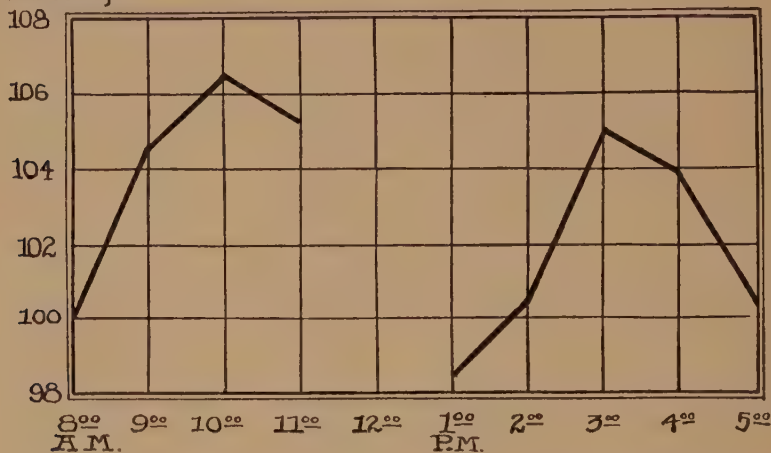


FIG. 36.—Which hours of the day are best for working? Here is a chart of the actual efficiency of a large group of college students at different hours of the day. The morning hours are apparently the better, at least the work is done more efficiently after one has been on the job only a few hours. The last few hours of the working day produce the least efficiency—except after lunch.

result was an increase in the number of accidents by two and a half times. For every fifty accidents with the ten hour day, there were a hundred and twenty-five with the twelve hour day. And frequently, physicians and nurses are required to be on active duty for almost twenty-four hours at a stretch! But even this long duty work has its compensations. These will be taken up later in this article.

It is possible for the same speed in work to be kept up late in the day as that which was started in the morning. It is the accuracy of the work that suffers. More errors are made after long continued work, less fine control is retained over skilled acts. The

surgeon likes to start out his working day with operations and reserves the afternoon for golf. The off-duty hours of the nurse are usually arranged for the afternoon.

Dame Nature must have had a lazy man in mind when she modelled human beings. One can really accomplish more by **resting frequently** than by working steadily through the day. Continuous exercise of a function is more fatiguing than intermittent exercise. By arranging for men handling pig iron to work twelve minutes and then rest three minutes, the output was increased from thirteen tons a day to forty-seven. And that was accomplished, not by working harder, but by resting frequently! Here we have a master key for the overcoming of losses in efficiency.

IMPORTANCE OF REST

Rest! Not idling, but **relaxation**. This is the secret to almost unseen powers. Nature's way of overcoming fatigue is by sleep. Sleep, whatever its nature may be, is a wonderful restorative. The organism is not in perfect quiet during sleep, the heart is pounding away, respiration is still occurring regularly, mental activities are on the job as is seen in dreams. But at that, sleep is perhaps the best restorative of losses in efficiency. The amount of sleep essential for recuperation is a variable quantity. Edison can get along famously with four hours out of every twenty-four spent in sleep. For others, that amount of sleep is merely a nap. All sleep is not the same, however. Lying abed with the eyes shut is only the outward manifestation of sleep. The soundness of sleep varies from hour to hour. About an hour and a half after retiring sleep is at its deepest; from then on it gradually becomes lighter and lighter. Lying abed mornings is not the best way to rest; that produces lassitude rather than rest.

During the actual working day one cannot very well go to sleep on the job to restore his efficiency to its former level. One scarcely needs to do that. **Short and frequent periods for rest**, not merely halting work but absolute rest, will accomplish the desired results.

In acquiring skill, short periods of practice were found to be more effective than longer periods. Much the same thing is found to be true for using skill. Not a half hour or half a day off duty, but numerous short rest periods while on duty. The length and distribution of these rest periods vary from task to task. For the skill involved in folding handkerchiefs, experiments showed that five minutes of work followed by one minute of rest produced the greatest efficiency. For mental work it may be best to work an

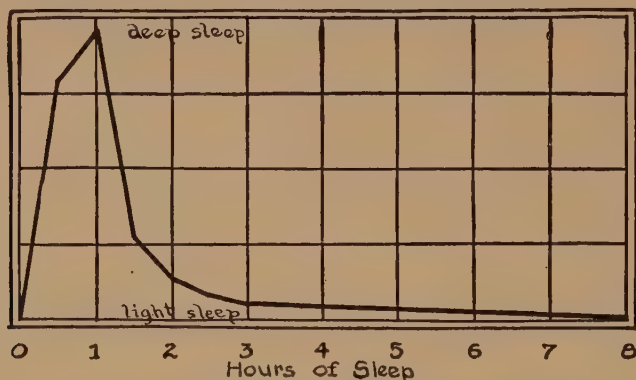


FIG. 37.—*When is sleep deepest?* This chart shows that one sleeps soundest the first hour after sleep begins. The later hours of sleep are very light.

hour and rest five minutes. The rest periods should be studied carefully to determine their best arrangement. If they are too long, there will be a loss of time; if they are too short, there will be but little gain in efficiency.

I have a physician friend who has a flourishing little general practice. His automobile is the lowly Ford. But he employs a chauffeur. Strange combination you say. Apparently so. But my friend has a method back of his madness. Between visits he relaxes, rests, recuperates, while his driver takes him to the next patient. He ends the day practically as fresh as he began. Long hours of work and night calls have but little effect upon him; he has acquired the art of relaxation. And when that is possible in a Ford, think of what might be accomplished under more favorable circumstances!

A SERMON IN THE HEART

The nurse should take heart from this physician. The nurse commonly has long hours of noble though oftentimes onerous duty. An hour off in the afternoon does not accomplish much restoration of efficiency and zest for the tasks of the day's work that remain to be completed. The little organ that is pumping away, from before birth until death halts its activities, may teach us a lesson here. Between beats the cardiac muscle of the heart pauses for just an instant—it rests. And then back on the job in an instant with renewed and indefatigable vigor. There is efficiency for you!

The nurse spends much of her time making patients comfortable; she might well try making herself comfortable. After a patient is tidied up and linen changed, **relax** for a moment. Then on with the routine tasks with renewed vigor and determination. Take advantage of every opportunity to **relax**; the cheeks will be rosier, the eyes brighter, and the heart lighter at the close of the day's nursing. It is not enough to **practise relaxation**, preach it as well. It is a wholesome and beneficial gospel to spread.

MONOTONY

Monotony, doing the same thing over and over again through the day, is a prime instigator of fatigue. A change of occupation, according to the dictionary, is a vacation. During the hours of duty **a variety of tasks** relieves the monotony that brings insidious fatigue. Performing the various duties of the nurse in an assorted order brings the change that removes monotony. The patient, too, may suffer from monotony. **Changes**, the unusual order, work well for both the patient and the nurse. Monotony is overcome by **change** and interest. **Change** is largely a mechanical affair; interest depends largely upon the individual. The person who pursues his daily duties with a consuming interest shows the least diminishing of efficiency that follows in the wake of fatigue. When interest is there, monotony has fled.

Certain factors in the environment influence the efficiency of the day's work. On cloudy days one has to force oneself to work.

Sweltering days may bring about intense discomfort. But the relationships are closer than that. Evenly distributed illumination aids efficiency, uneven illumination is a handicap. Intense, glaring lighting is not the most suitable, but moderate, evenly distributed illumination. Deprivation of oxygen brings about much change. When a person has been under a thin supply of oxygen, it becomes necessary to shout to get his attention; marked emotional changes may take place, the person becoming sullen or silly.

Drugs obviously modify one's efficiency greatly. Unfortunately, however, there is little, if any, reliable data on the effects of various drugs. **Alcohol** has a generally deleterious effect; it is a depressant rather than a stimulant, it lowers one's efficiency. Manual skill is impeded by a loss of finer motor control; so-called mental skills are also lessened by this drug. The fact that alcohol was long considered a stimulant, is probably due to those who had partaken of it, tending to overrate their own abilities. Extensive experimental work shows that it is really a depressant.

Caffeine, such as is present in an ordinary cup of **coffee or tea**, seems to act to increase mental efficiency. There is no evidence that, following this initial increase, there is a decrease. Unusual effects produced by this drug may be due to an anaphylactic condition, or to the individual expecting that something unusual ought to happen. When proper experimental conditions are followed, and the person does not know whether he takes caffeine or milk, different results are found.

The effects of **tobacco** are still undetermined in an impartial way. The work on this weed has been intensely partisan, and consequently unreliable. The effects are, moreover, intrinsically difficult to determine. Caffeine can be administered without the person knowing it. Tobacco smoke, however, is much different. One cannot reason from the effects of nicotine to the effects of tobacco. In smoking, the nicotine of tobacco is changed into pyradine and other substances. In chewing, the nicotine may enter the system. Owing to the great consumption of tobaccos in every form, it is urgent that something be known about their influence

upon efficiency. Other drugs, also, should be studied with this view in mind.

The day's work is about the most important thing for any of us. Using our skills so that the most can be accomplished with the least wear and tear on ourselves, is the conservation of health and interest. One may use his skills in a haphazard sort of a way, as the shiftless Rip Van Winkle used his. Or one may direct them intelligently. Using skill thus comes to be synonymous with using the skull, or, more precisely, that which lies within the skull.

TOPICS FOR DISCUSSION

1. It has been said that enthusiasm and a good stiff job are the best antidotes for fatigue? Do you agree with this?
2. What opportunities present themselves for relaxation while on floor work?
3. Interest is the prime antidote for monotony. What things can you think of that would break up monotony in a patient?
4. Give all the reasons you can for having a patient who is learning to use a maimed limb practise in short periods.

CHAPTER XI

THE TEMPERAMENTS IN NURSING

Individuality—Thinking: Feeling: Doing—The Body and Feeling-tone
—What Moods are—What the Temperaments are—The High
Speeds—The Slow Pokes—Temperaments in the Sick-room—How
Bad Temper Runs in Families.

A FACTOR which looms large in daily experience with patients is what may be called the **temperamental equation** of the patient. Each case which comes under your care is an individual case in the fullest meaning of the term individual. It is more than a matter of individual disease and pharmaceutical individuality. The patient is as much an individual personality as an individual person.

Those marked and obvious variations between individuals, as they concern the sick-room activities, are not organic and physiological variations, but differences in that somewhat intangible group of mental characteristics which give rise to what is called the human quality or **personality**. It is this factor which makes attendance upon one patient a tiresome drudgery, while another case, similar in all respects save the personality of the patient, is a refreshing joy.

I know of no school which includes human personality in its curriculum, unless it might be the prolegomena where ethics are under discussion and "always cheerful, always consistent, always considerate" are found to be some of the complex traits that aid one to approximate the dignity and pleasant reserve of personality which the profession of caring for the ill requires. I am of the opinion, however, and feel certain that those with extended experience will support my contention, that, in innumerable cases, it is the personality of the patient rather than the personality of the nurse that causes a maladaptation of the sick-room situation.

The grumbling, discontented, mischievous, happy, grateful patients make attendance a boredom or a delight, as the case may be.

These traits are primarily a matter of the temperamental characteristics of the patient. These, plus what may be called character traits, are the prime constituents of the personality of the patient. A careful study of the more important elements of the patient's temperaments evidently would go far toward facilitating an adjustment and reducing the strain on both patient and nurse, making nursing a bit more endurable at times, if not at all times, and, as will be shown in detail in the next chapter, the personality traits which we will consider are really influential in assisting or hindering a recovery. In later chapters, the factor of character traits will be considered.

THINKING—FEELING—DOING

To establish an adequate basis for the understanding of the temperaments, it is necessary to go rather minutely into a consideration of the affective life. The prime mental component of the temperaments is to be found in the **affective life**, which radiates into all activities of the human organism, and, on occasion, dominates the whole behavior.

The older psychologists divided all mental activities into three divisions, thinking, feelings or affection, and doing. Whether or not this division is accepted, some idea of the vast sway of this affective life can be gleaned from the statement that it is always present; not rarely it is the ruling element, dominating both the overt behavior (visible action such as striking at an enemy in defense, flight from danger, or blushing) and implicit behavior (reactions ordinarily unperceived, such as glandular response, small invisible muscular contractions, changes in cell permeability, increase of the Nissl substance in nerve cells, etc.) of the organism.

All mental states, all human behavior, are accompanied by **affects** or what may be termed a **feeling-tone**. As you read these lines, the perception of words and meanings is accompanied by a feeling of **pleasantness or unpleasantness**, of mild pleasure or displeasure. This feeling of agreeableness or disagreeableness may

be caused by cramped diction in these lines, by a disapproval of the subject about which you are reading, by a persistence of some memory of a grumbling patient which the second paragraph brought to mind, or by the fact that all evening you have been elated over the perfect beauty and becomingness of a new hat which was purchased this afternoon. Whatever the cause of this feeling of pleasantness or unpleasantness, which you are just now experiencing in a mild or marked form, it is present; and can be discovered by observing your own behavior.

This vague feeling may perhaps be more readily discovered if you recall a pleasing scene which you have witnessed, and contrast the feeling of pleasantness with the unpleasantness caused by memories of an accident or a severe reprimand. Motion pictures offer an excellent opportunity for the observation of affective states, although it must be confessed that such observations take the edge off the dramatization. If one can catch himself in a state of mental excitement or pleasure, mirth, fear, tender emotion, or grief while witnessing a motion picture, an almost unparalleled opportunity is had for observing the general feeling of expansion which goes with pleasure, and dry palate in fear, the quivering laryngeal musculature in tender emotions, and so on through all the varied feeling-tones.

THE BODY AND FEELING-TONE

The mild affective tones, as well as the stronger emotions, are characterized by certain typical bodily changes. It is a commonplace to state that "Jones looks happy" or "Smith looks sad to-day." This **facial expression** of certain affective tones is known as their *facies*. Attempts have been made to study the affective life of animals by observing this facial expression, which is characteristic of certain types of affectively toned experiences. Finer measurements have shown that pleasurable states are usually accompanied by an increase in the pulse power; respiration is deeper, the peripheral blood vessels are dilated, and the force of bodily movements is increased. Unpleasurable states usually, but not always, produce the opposite results.

This affective quality of pleasantness and unpleasantness is always present in our mental life, but varies in amount and kind from time to time. We are not always exuberantly joyful or miserably melancholy. A generally optimistic person, however, is usually an optimist against all odds, and the optimistic strain permeates his entire behavior, although the death of a loved one may alter his affective tone temporarily.

These feeling-tones which accompany all behavior are known as **simple feelings**, when they are of a fairly simple nature, and

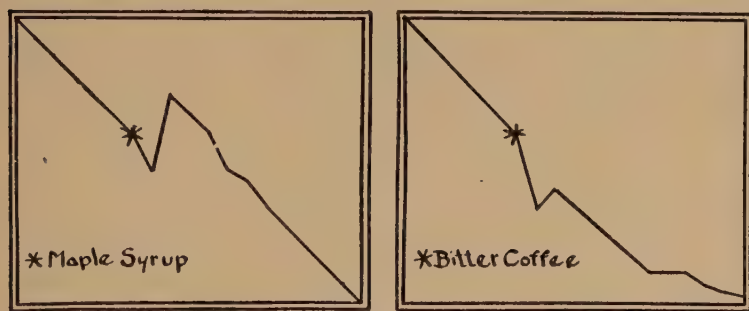


FIG. 38.—How simple feeling-tone influences muscular strength. These are curves that show the diminution in strength due to fatigue. In the curve to the left, maple syrup was given the subject after five exertions. Notice how the strength was increased after this pleasant stimulus. The chart to the right shows how an unpleasant stimulus has the opposite effect.

arise directly from some immediate stimulation; for example, the unpleasantness many persons experience in hearing the squeak of a caster or in smelling asafœtida. When the affective reaction is more complex, and the stimulus or cause is less definite and less simple, the result is known as an **emotion**. Examples of emotions are fear in an accident, grief over the demise of a friend, joy at again meeting a relative from whom one has long seen separated.

When the affective state is extremely intense and of relatively short duration, we have a **passion** such as anger, rage, and terror. In the other direction we find an affective state, which amounts to a moderate emotion, is continued for some time, and is termed a *mood*. We have, as illustrations of moods, a "spell of the blues" and its opposite state of general mental well-being.

WHAT THE TEMPERAMENTS ARE

Moods of moderate intensity may become continuous and really permanently dominant in one's life. Thus we have the various **temperaments**, such as the continually anxious, the eternally suspicious, the quarrelsome, the optimistic. Temperaments are thus found to be affective states of weak intensity and long continued, almost to the point of permanence.

As long ago as four centuries B.C., Hippocrates, the ancient physician, propounded his fourfold classifications of the temperaments, which is classic to this day. His divisions are the sanguine, the choleric, the melancholic, and the phlegmatic. Galen, the early physiologist, described four humors in the body, namely: phlegm, black bile, yellow bile, and blood, and to these he ascribed the different temperaments. According to Galen, for example, individuals in whom the phlegm was dominant would be phlegmatic, and so on with the other humors. The bodily reactions do have a very important part in the temperaments, as we shall later find, but it is not nearly so simple a matter as Galen would have had it.

At this point, nothing could profit us more than to take up the temperamental symptoms, so to speak, of these four classes of temperaments. This will make it possible to gain some insight into the behavior of our patients and ourselves, and when the practical indications are reached, there will be some fairly concrete illustrations in mind with which to start.

The **sanguine** are optimists, enjoying life as they find it and taking a great joy in life. They are happy and hopeful, bubbling over with enthusiasms, but still conservative and reasonable in their enthusiasms. On the score of action they can be described as rather slow to action but strong when once in action.

In contrast with these sanguine temperaments that make the best of things as they find them are the **choleric**, who are usually dissatisfied with things as they are and go ahead to improve the order of things and remodel creation to conform to their choleric fancies. The choleric are much quicker to respond than are the sanguine, and respond much more vigorously. They are fitful and

uncertain, self-conceited, quarrelsome, overbearing, jealous, inordinately haughty, and strong in retaliation. Friendship with a choleric is always uncertain, for it may end in a fit of passion; he is always right and others are always wrong. He is the political radical, the person who revolts from religious cults, who resents taking orders. He is an artist at stirring up things, whether it is trouble or a discussion; he can plan more in a day than most people in seven. It has been said that their speedometer registers twice their actual mileage.

THE SLOW POKES

The **melancholic** are not exactly what might be implied by the name. Primarily, they show a tendency to delay the response to a situation until it has been carefully pondered over. Even then, they are usually somewhat hesitant in action. They are not interested in the superficial, but possess a basal seriousness, and consequently have a great capacity for heartfelt sympathy and deep affection. They are religious as a rule, with a tendency toward mysticism in their religion. They have a slight range of emotional variability, and will laugh and jest on occasion, but in general are a worried type, lingering on the darker side of things, moody and anticipating troubles that never happen.

The **phlegmatic**, like the melancholic, are slow to action but with these, even after the action has been carefully pondered over, it is usually avoided by inaction. They are the easy going persons; repose rather than action is their chief characteristic. They joke with difficulty, and have a tendency to criticize others scurrilously. Ordinarily, they are not easily started into action; but when once under way display no little persistence. They have an inability to be depressed or overjoyed. They are not quarrelsome and are not effusive. Where the choleric will slap you on the back and shake hands vigorously, the phlegmatic will recognize you, perhaps say "Good morning," and possibly shake hands or lift his hat in recognition.

The choleric, especially, and the sanguine, to a considerable degree, are on the plus side of activity. They are both energetic

types. Accordingly, they have been termed the **hyperkinetic**, from the Greek *ὑπέρ* meaning excessive, and *κίνησις* meaning energetic. The phlegmatic and melancholic, on the other hand, are marked by less than the usual amount of activity. Following the same Greek naming they have been called **hypokinetic**, from *ὕπὸ* meaning a deficiency.

TEMPERAMENTS IN THE SICK-ROOM

Patients with the choleric temperament are the prime grumblers and fault-finders. They take the lead in seeking trouble and dissatisfaction. They are ordinarily accustomed to use a large amount of superficial energy as an outlet for their desultory mental energization. This activity must necessarily be curtailed in the sick-room, and unless this temperamental motivation is given a motor outlet, as it is in the "fidgety," restless patient, the nurse or attending physician is very likely to be made the object of wordy abuse and criticism.

The phlegmatic patients are quite in contrast. They are quiet and monotonous almost to dullness. They are reluctant about spontaneously conveying information regarding their bodily condition. They require much more observation to their condition of health than does the choleric, who will make known his least discomfort and request the pillow changed and the sheet smoothed dozens of times daily.

The melancholic are overtly eager to obtain sympathy, and are usually worried about their condition of health. They are not primarily complaining, just fearful. They fear the nurse will perhaps fatally neglect them at a crucial moment in their disease, and, in almost the same thought, will entertain the fear that the nurse is overworking and will, perhaps, contract some disease from them.

The sanguine patient is perhaps the best all around patient—jovial, frank, loath to complain or cause any unpleasantness, adaptable to a wide variety of situations, and capable of appreciating the trials of doctoring and nursing. It is these sanguine patients who, when on a ward, are the first to indicate that they understand the fact that some of the other patients are millstones; by their

well-liked personality they add a measure of cheer to many a difficult ward situation. But, at the same time, they are the ones who are usually unaware of their own part in causing any unpleasant or trying experiences.

Among one's friends and acquaintances it is possible to select certain who are unmistakably of the choleric type, others of the phlegmatic, and so on. It is also possible for one, if he is very frank with himself, to introspect and find his proper niche in the above classifications. It is of no little value to make such an analysis of one's self and try to find out just what are the strong points and the weak points of our personal temperaments, for they all have their strong as well as their weak points.

For some, it may be a difficult task, however. Aside from the matter of absolute frankness, there are many types that are called **mixed types**. In these, an ordinarily sanguine personality is altered somewhat by an admixture of the melancholic or the choleric. As a result, it is extremely difficult to really determine which is the predominant temperamental trait. More will be said about this in other chapters.

One can always depend upon the melancholic hunting for the dark side of things, and the choleric jumping off the handle and into activity. In the case of the mixed temperaments, however, one cannot tell which way their affective life will turn. They are the hard ones to predict.

We have an example, not of the mixture of the temperaments, but of their alternation, in the **cyclo-thymic** personalities, in which the choleric and the melancholic alternate. When these two particular temperaments become very marked and their alternation definite, so that they can scarcely be considered normal any longer, we have a maniac-depressive mental disorder with which every nurse should be familiar.

HOW BAD TEMPER RUNS IN FAMILIES

A most remarkable study of **the inheritance of the temperaments** has been made by the Eugenics Record Office of the Carnegie Institution. Records were collected of 146 marriages

which had resulted in 629 children. All were classified, according to temperaments, and their inheritance thus determined, as it occurs in everyday life.

It was found that there is probably a factor of excitability (E) transmitted through the germinal cells from parent to offspring. This factor is dominant to the lack of excitability (e), just as brown eyes are dominant to blue eyes. These hereditary temperamental traits follow the Mendelian laws of inheritance. For instance, all the children of parents who transmitted the dominant character would be choleric, since they received a double dose, as it were, of the factor of excitability. In other words, when both parents are choleric, all their children will be choleric. When both parents are sanguine, only one-half of the children are sanguine, while one-fourth are choleric and one-fourth phlegmatic. This is because the sanguine parents contain a single germinal factor for excitability and another for its absence, while the choleric contain a double dosage of the factor for excitability.

TOPICS FOR DISCUSSION

1. Which of these words have pleasant feeling-tone, which unpleasant: Riverside, guts, Packard, lunatic, patient, invalid, convalescent, dee-de-lum, agony, merriment, corpse, cadaver, stiff, sozoform, physic, laxative?
2. When two words can be used for the same meaning, would you use the one with pleasant or unpleasant feeling-tone?
3. Should motion picture actors study the glandular changes in emotions or the facies of emotions?
4. Write five hundred words portraying your temperament and conclude by diagnosing yourself.
5. A class can well make a study of the temperaments of certain well-known patients in the hospital.
6. What temperament did Florence Nightingale have? Theodore Roosevelt? The Kaiser? Woodrow Wilson? Judging from the style of this book, what temperament does its author have?
7. Cite families of your acquaintance that show how bad temper, or good temper, runs in families.

CHAPTER XII

INDICATIONS IN THE TEMPERAMENTS

Goitre and Temperament—Dementia Paralytica and Temperament—
Temperaments Both Learned and Unlearned—The Bodily Response and the Mental Response—Metabolism and Temperament—
Nursing the Temperaments—The Temperament of the Nurse.

WHILE the contribution of temperament to the personality of the patient is primarily a matter of mental characteristics, it is nevertheless influenced to some extent by certain bodily conditions. Some such relationship was anticipated in the last chapter when the influence of emotions upon bodily conditions was discussed. It is easier to be an optimist on a full stomach than when experiencing the pangs of hunger and with no sign of food in sight. But the relation is more direct and specific than that.

The cheerfulness and hopefulness of the consumptive is a matter of common observation. Exophthalmic goitre is almost always accompanied by a change of temperament to the melancholic, oftentimes of extreme degree, regardless of the previous temperament of the patient. The nursing and surgical care of these patients is an art in itself. Evidence is submitted by some to indicate that, under certain conditions, this disease may be caused by emotional factors. But, as Bram states, "though they differ in their respective mode of therapeutic approach, surgeon, röntgenologist, and internist fully agree on the importance of psychotherapy as a necessary element in their armamentarium. The careful, experienced surgeon does not operate precipitously, but rather gradually, leading his patient on by smiles, a friendly attitude, and suggestive influences, to the point where the scalpel can be applied with the least operative risk."

A fatal disease of the nervous system, *dementia paralytica*, which is caused by the *spirochæta pallida*, is frequently character-

ized by a change of the temperament in the direction of the sanguine or choleric type. In **alcoholic drunkenness**, the change is not so specific, for the sanguine business man may become melancholic and weep on his friend's shoulder, he may become phlegmatic and sleep in semi-lethargy, or he may become choleric to the extreme and require the restraining assistance of several friends to get him home, without too seriously disturbing the peace of the neighborhood.

The temperamental characteristics of the personality also vary somewhat with age, race, and choleric, **Childhood and youth** are proverbially sanguine and choleric, **old age** melancholic and phlegmatic. It is probable, however, that the fundamental temperamental characteristics remain very stable. Only the excitants and the bodily means of response vary to any marked degree. Residents of the **temperate zones** are popularly thought to be more sanguine and choleric than the phlegmatic inhabitants of the **tropics**. Variations may occur, however, within a single zone, for it is said that the average Teutonic peasant is phlegmatic, the average Englishman melancholic, the Frenchman choleric, and the American sanguine.

TEMPERAMENTS BOTH LEARNED AND UNLEARNED

A large portion of the temperamental traits are fundamental and relatively unchangeable, some are compensatory, and others are conditioned. The **fundamental traits** are those that are a racial or family characteristic and are apparently inherited much after the manner of eye color and stature, as was shown in the preceding chapter. It is upon the groundwork of these fundamental temperamental traits that the compensatory and conditioning processes are erected. The past behavior history of the *family* determines the fundamental traits.

As an example of a **compensatory** contribution to the temperament we may consider the hypothetical, but very real case, of an only child who, by all criteria, would normally be expected to be of the sanguine temperament. Oversolicitude of the parents regarding

his welfare in infancy and childhood soon becomes a thing to be desired for itself rather than for the candy, movies, and coddling it will bring. Not having been hardened to the experience of not having his desires and whims immediately fulfilled as a child, he enters upon adult life and into the world of reality, too soft-skinned and inefficient to make healthy adjustments to the situations of actual life. He recognizes no defects in himself or his attitude, but **projects** them into the outer world, becoming typically choleric in his criticisms, impatience, and jealousy; or, if the world gives him a rather cold reception and he meets severe rebuffs, his fundamentally sanguine temperament may become mixed, with a melancholic moodiness at disappointment or worry over more anticipated rebuffs. It may be very probable that, in the case of mixed temperaments, the basic strain of the affective life has been worked on by a compensating process similar to that outlined briefly above. We will have more of this in the chapter on "How Behavior Indicates Mental Life," in which the compensated results of certain types of past behavior histories of the individual will be gone into in detail.

We have seen how the basic trend of the temperamental component of the personality may be altered by disease and drugs. The endocrines or the glands of internal secretion have been carefully investigated by several workers, notably Cannon¹ and Crile,² and their bearing upon the affective life undisputably established.

THE BODILY RESPONSE AND THE TEMPERAMENTAL RESPONSE

When the affective life of an animal becomes intensified, the **adrenal glands** become more active than usual and an increased amount of adrenalin is secreted. The adrenalin is poured out directly into the venous blood, by which it is carried through the blood vessels to the other organs of the body. When this adrenalin

¹ W. B. Cannon, *Bodily Changes in Pain, Hunger, Fear and Rage*, New York: D. Appleton & Co., 1915.

² George W. Crile, *The Origin and Nature of the Emotions*, Philadelphia: W. B. Saunders Co., 1915.

in the blood stream comes into contact with the liver, it stimulates the liver to pour out more glycogen, the thyroid secretion is increased, and the permeability of the muscle cells increased.

The result of these changes is to **alter the entire metabolic condition** of the organism. The intestinal peristalsis is halted by the action of the adrenalin since it inhibits the non-striated musculature of the intestinal tract, just as it causes the hair on the cat's back to stand erect when the cat is under emotional strains, such as fright or anger, by affecting the small non-striated muscle at the base of these hairs. The digestive secretions are also inhibited through the same emotional causes. This explains, in part, the loss of appetite, and even gastric disturbances incident to emotional strains, or a "spell of the blues." Energy is not to be obtained from the food under such circumstances. Metabolism under these conditions depends upon the reserve food supply stored in the cells of the liver which empty their sugar into the blood stream under adrenal or emotional stimulation.

With the more intense affective states, this altered metabolism and secretion is greatest, but changes similar in kind but lessened in amount go with the weaker affective states. Thus the altered thyroid secretion in exophthalmic goitre is accompanied by temperamental alterations. It is in this connection that we speak of the **organically conditioned temperamental traits**.

METABOLISM AND TEMPERAMENT

When the personality dominated by a melancholic temperament becomes unusually depressed from any reason, an altered metabolism ensues. Now this altered metabolism is in a direction to facilitate an increase in muscular activity, as has been shown in the preceding paragraphs. In other words, under emotional or temperamental stress, the organs which form what Crile calls the **kinetic system**, are stimulated into increased activity. When there is no adequate outlet, as in the case of a bed patient, for this activity which nature has provided, the activating secretions must be reduced through the organs of elimination and usually overtax these organs in this elimination. The condition of glycosuria may thus be

affectively conditioned. Gastric ulcers were of a relatively frequent occurrence among soldiers at the front. These ulcers were not caused by the government rations, but by an altered metabolic state, conditioned by the fear and general tenseness of the affective situation in the battle lines. During the intervals between the actual fighting there was no opportunity for the muscular action needed to work off these increased glandular products which were caused by the intensified emotional state. Nature had provided these secretions for use under just such circumstances as these, but modern methods of fighting, with the long periods of sluggish inactivity in the trenches, gave no opportunity for this response.

Emotional excitement is characterized, on the surface, by changes in the pulse rate and pressure, the rate of respiration is altered, temperature changes occur, "cold sweat" appears, and, in extreme instances, muscular tremor or perhaps complete loss of muscle tone. What is the significance of these bodily changes? They forcibly reflect the fact that **preparation is being made for great bodily activity**, which usually does not take place. The activities, which are chiefly concerned with digestion, are suspended, that the entire energies of the animal may be used for the overt activity, hence the hollow feeling in the pit of the stomach. It is for this reason that eating when immediately under the influence of joy or sorrow is oftentimes temporarily injurious; the secretion of the pancreatic and other digestive fluids is suspended by the body under affective intensification, while those which activate metabolism in the contractile tissues are secreted in greater abundance.

It is important for the nurse to know that the inhibition of the secretion of the digestive juices persists for a considerable length of time after the emotional outbreak has apparently subsided. Wise parents recognize this, in not permitting their children to eat for some time following an emotional storm such, for example, as a manifestation of anger or even impatience. The food may be withheld as a means of punishment, but there are important physiological and psychological justifications for the feeding being delayed. It is also important to know that even a mild emotional state may be accompanied by a continued inhibition of peristalsis; it is not

necessary for one to faint with fear for the bodily accompaniments to appear, slight and apparently insignificant emotional stresses and changes may suffice to bring the kinetic system of Crile into action.

NURSING THE TEMPERAMENTS

What are the practical nursing indications to which our brief survey of the psycho-physiology of the temperamental factor in nursing have led us?

First, we have found the reciprocal action between the affective life and the metabolic conditions of the organism. This should indicate the desirability of keeping the affective life at a stable, healthy level. Those patients with an affective tone near either extreme of pleasantness or unpleasantness should be brought down to a normal level. Extreme joy is as influential as grief in causing an increase in the activities of the kinetic system and in all patients, where the metabolic balance is rather delicate, all extremes, however slight, are to be avoided. The proverbial "visitors' day" rise in temperature is an indication of this with which all nurses are familiar. Emotional strains will halt the milk secretion in the nursing mother. Temperamental adjustments are thus found to be something more than merely a matter of happiness and enjoyment; their roots go deeply into the organic processes, and in nursing many cases the temperamental equation may require closer attention than the temperature and ventilation.

Our familiarity with the temperamental types will make it possible to evaluate the personality situation early in the contact with a case, and plan the appropriate nursing tactics accordingly. As a rule, the phlegmatic and sanguine require but slight attention that is out of the ordinary. Obviously, all sources of irritation must be kept away from the choleric, all questions and topics which might lead to an argument must be tactfully avoided or evaded, and a certain amount of criticism and stickling over petty details expected. A very fruitful procedure with such patients is to appeal to the desire to please. That is, when occasion arises, praise for some little act or bit of conduct will appeal to the choleric vanity and

more praise will be solicited and should be given only when really merited, that it does not degenerate into a game of flattery. The energies of the choleric should never be repressed, but rather guided and directed.

The melancholic need their interests enlarged, a pleasant room, their food served in an attractive and appetizing manner. Reading or some light occupation is valuable to draw out some interest and with it activity. All nursing procedure should be reduced to a minimum and performed with the least possible show, that no indication of overconcern regarding their state of health be aroused in the patient. The melancholic trait of looking within for pains and worries should be replaced by a wholesome interest in external things. Mere admonitions to stop worrying or to do something are inefficacious, and simply serve to focus the attention on the undesirable traits. The melancholic must be engaged in some profitable activity or interest. The texts on occupational therapy and sick-room occupations have much to offer in the way of suggestions for procedure with these patients.

THE TEMPERAMENT OF THE NURSE

So much for the personality of the patient. Psychologists describe a mental mechanism which is called **empathy**. This term designates the ability to feel one's self into a certain situation. A person with no tinge of the melancholic in his temperament, either fundamental, compensated, or conditioned, would be incapable of genuinely feeling himself into a situation as the melancholic patient senses it, hence such a person would be totally unable to understand the vagaries of human nature as expressed in the melancholic. The same applies to the other temperaments as well.

Now the question arises as to just how far the personality of the nurse is causative in sick-room maladjustments. A thorough-going choleric nurse certainly does not fit in a situation with a melancholic patient, and neither does a phlegmatic nurse improve the situation with a phlegmatic patient. To be thoroughly adapted to various personality situations which may present themselves from time to time, the nurse should possess a widely mixed range

of temperamental traits; perhaps a fundamentally sanguine strain upon which have been grafted compensating and conditioning traits to make a well-rounded emphatic basis. As much insight into this human quality of temperament can be gleaned from a close inspection of one's own qualities in this respect as from a distant observation of others. And, after all, it is largely our own emphatic capabilities which govern the temperamental equations of which we are a part.

TOPICS FOR DISCUSSION

1. Is temperament more closely related to the central or the autonomic parts of the nervous system?
2. How would you explain to a patient the undesirability of an outburst of anger in the sick room?
3. Is it a good thing to work off a temper?
4. Discuss with others in the training school, procedures for dealing with the different temperaments.
5. If emotional disturbances stop the flow of saliva, how do you account for your mouth watering when you smell a juicy steak?
6. Recall some patient that you utterly failed to get along with. Study especially the temperaments and find what was at fault.

CHAPTER XIII

INSTINCTS AND THE PATIENT

Dame Nature Typically Feminine—What the Instincts are—Are the Instincts Modified?—The Inevitableness of Instinctive Activities—Instinctive and Skilled Action—Instinctive Activities in the Control and Prediction of Behavior—Instinctive Behavior in Man—Appealing to the Instinctive Activities.

As one sizes up his fellow-men, he is impressed with two opposed observations. First of all is the observation of certain structures and functions which are possessed by all mankind. All human beings—barring accidents—possess a certain number of limbs, certain body characteristics, a stomach, a lung or two, and several yards of intestines. It is these morphological and physiological characteristics, common to certain groups of living organisms, that make it possible for the naturalist to classify animals into families and species.

But Dame Nature is typically feminine—she goes by contraries. Therefore all members of the same species, as in the case of Man, have little differences that mark them off from the rest of the group as individuals. The typical man may be about five feet and ten inches tall; but some grow to be eight feet tall and some stop growing before the three foot mark is reached. These are the giants and dwarfs, but still they are human beings with all their peculiar appearances. There are all sizes and sorts of men between these extremes. There are some, in fact, who go to such extremes as to have all their internal organs arranged in just the reverse sides of what is usually the case.

These observations are a commonplace; but they serve to bring out the point that there are two groups of factors to be dealt with in studying living things. First of all there are those fundamental

factors common to all members of the group. Then there are those variable factors which we may pass by for the present as *individual variations*. Those factors common to the group as a whole, such as reflex behavior, give a record of the past behavior history of the group. The individual variations, to a large extent, are a record of the past behavior history of the individual.

This division of the two groups of factors is easily accepted by the physician and the nurse regarding physical and physiological characters. Every day of their experience serves to reinforce this division into two groups. It is also essential that they make this same distinction in the matter of psychological characteristics. Here one finds it quite easy to notice mainly the individual differences and to neglect the common factors back of all behavior.

In this chapter we will limit ourselves to some of the common factors in behavior. Just as one finds the anatomical arrangement of the living organism to be modelled after a certain definite pattern, so do certain features of the behavior of organisms at the psychological level function after a common pattern from one individual to another. These are the inborn *reaction patterns*, determined by the inherited connections in the nervous system and ductless glands.

The simplest of these reaction patterns are those which are usually termed the reflexes. These take place at the reflex level and are organized solely within the spinal cord and brain stem. Their patterns include only nervous tissues; the ductless glands play but little, if any, part in determining reflex behavior. We have, as examples of this type of reaction, the "knee-jerk" and the reflex dilation of the pupil of the eye under differing intensities of illumination. This reflex behavior is under the control of the simple reaction patterns; it is usually beyond voluntary control, and the action may take place without the actor being aware of it. The "knee-jerk" and the pupillary reflex take place invariably under normal conditions when the proper stimulation is applied; they are altered only in severe diseases, and they take place without the reactor knowing about it, in many instances, as has been occurring year upon year in the case of the pupillary reflex.

WHAT THE INSTINCTS ARE

At a somewhat higher level of behavior, there are common reaction patterns which are handed down from generation to generation, just as are eye color and the digestive tract. These more complex reactions usually involve a **much greater amount of the musculature** and organs than do the simpler reflexes. This does not mean, however, that they are characterized by diffuse action. They are more than simply complicated reflex reactions; they involve glandular products in their patterns as well as neurones. The instincts furnish the tendencies to action which guide the more complex activities of the living organism.

The instincts are unlearned; they come to the individual quite spontaneously and without any coaching. They **vary but little** from person to person; they are the great sources which prompt certain responses common to the race. It is the instincts which give one insight into the most serviceable means of controlling the behavior of others in a natural and still effective manner.

There is nothing at all mysterious about the workings of the instincts. Indeed, there is nothing mysterious or miraculous about any part of the mental life; it is all a matter of cause and effect. In the case of the instincts, for example, man and all other animals receive as part of their equipment with which to start life some definitely arranged muscles, bones, glands, and neurones among other things—excluding for the time being as a part of Nature's equipment one's maiden aunts and the family Ford. The way the muscles, bones, and nerves are arranged there predetermines just what many of the activities of the organism shall be like. We have already seen how the simpler reflexes are determined in this manner.

The instinctive activities, too, are controlled through certain inherited patterns. But they involve a larger portion of the organism and are usually under voluntary control. The crasser sexual instincts offer an illustration of this. With the maturing of the sexual glands, the pattern controlling this type of behavior becomes completed, through the addition of the internal secretions from the

gonads, and the sexual instinct pure and simple ripens into a full-fledged and very potent existence. We saw how the reflexes waxed and waned, as in the case of the Babinski reflex. **Instincts, too, wax and wane**, depending upon the maturation of certain elements in their patterns.

ARE THE INSTINCTS MODIFIED

The reflexes were found, in chapter seven, to become altered through a conditioning, either of the stimulus which starts the reflex activity, or through a conditioning of the response itself. The instinctive activities are likewise modifiable. In the lower animals, such as worms and insects, the instinctive activities are capable of but little modification. They are perpetually machine-like in their precision and development. In the higher animals and Man, however, **instinctive activities may become altered**, or perverted, in ways much similar to the conditioning of the reflexes.

The sex pervert was not born so but has been made one by certain features of his past personal behavior history. Here the sex instincts may have become modified, either by a substitution of stimuli as in the homosexual person, or by a modification of the response as in the Sadist or the sexually frigid person. Experiments have been performed on pigeons, which show in detail how the normal sexual instincts may become modified through a conditioning process. More detail will be given about this conditioning of inborn tendencies to action in this and later chapters.

Under favorable environmental conditions instinctive actions develop spontaneously and normally. No coaching or training is necessary for them. We have already stated that the activities of insects are dominated by their instinct-patterns. This does not mean that their actions are crude or mediocre. Wonderfully designed actions are gone through by insects purely on an instinctive basis. Take the mason-wasp for example. A matured wasp that has never seen another living thing go through the same behavior will build a mud shell to enclose the eggs which it lays. Then it procures caterpillars, paralyzes them with stings along the spinal ganglia, and fills up the mud shell with these paralyzed caterpillars.

After obtaining enough of the larvæ for the food supply of the young when they hatch from the eggs, the mason-wasp seals up the mud shell. All this complex activity is instinctive. **There is no reasoning or thinking at the basis of it.** The mason-wasp simply follows out the inborn tendencies to act in this way.

Human beings, as well as mason-wasps, have many instinct-patterns as the basis for much of their daily activities. One cannot tell why they are attracted toward members of the opposite sex, or why one struggles and fights when in a dangerous situation. To behave in this way comes naturally to the human being; it need not be learned. In fact, it is usually no more learned than was the activity of the mason-wasp in building its mud shell and paralyzing the caterpillars. But in human beings, the instinctive activities may become modified through the agency of the intermediary neurones. The insects go through the instinctive activities common to all of the species in an invariable manner. Higher animals, such as Man, may have their instinctive behavior modified. But the instinctive-pattern is back of much of Man's behavior regardless of its modification through the past behavior history of the individual. The instincts themselves are probably a record of the past behavior history of the race.

THE INEVITABLENESS OF INSTINCTIVE ACTIVITIES

Let us consider for a moment the almost fatalistic nature of instinctive behavior. The flying of birds will afford a good example for study. Nests have been robbed by experimenters and the wings of the fledglings have been tied before they had seen other birds fly. Considerable time later their wings were released and the young birds, spontaneously, and without any previous training and observation, began to fly. Wonderful, you say. But consider for a moment: what else could the bird do with his wings? There is little else that he could do. Muscles and bones are arranged for flying; neurone connections are arranged for the same purpose. So they fly—they could not use their wings for any other purpose in a successful way if they tried until doomsday.

And as the glands, bones, muscles, and nerves of Man are hooked together, there are numerous unlearned tendencies to action in the highest of the animal kingdom. Perhaps the first manifestation of these tendencies is in the sucking of the new-born babe when placed to the mother's breast. From that moment on, the taking of nutrition comes to be one of the essential acts in the life of the human being. Here is a fairly complicated action; a whole series of reflexes, glandular and autonomic stimuli are prominent. The whole activity is performed without any coaching on the part of the parents, has a semblance of voluntary control, and is common to the race. These are the essential characteristics of instinctive actions.

INSTINCTIVE AND SKILLED ACTION

It should be clear by now what the qualities are that characterize instinctive actions. Before proceeding further with this type of action it may be well to take a few lines to distinguish instinctive from skilled action. The instinct-patterns provide tenacious inclinations to act in certain unlearned ways that are common to the race. Skilled action has been acquired by the individual and is not common to the race as a whole.

Eating has an instinctive basis; taking food three times a day and holding a little finger at a delicate angle when manipulating the fork are acquired, skilled, habitual actions. So, it is apparent that skills soon come to veneer the surface of the instincts and alter their manifestations. But the instinct-patterns are still there and urging the organism on to action; it is only their outward appearances that have been changed.

The instincts are the remnants of the past behavior history of the race; the skills are the remnants of the past behavior history of the individual.

INSTINCTIVE ACTIVITIES AND THE CONTROL AND PREDICTION OF BEHAVIOR

The two cardinal aims in an applied science, it will be recalled, are to be able to predict and control. In the practice of psychology

one wants to predict and control behavior at the psychological level, either the behavior of others or the behavior of oneself. We have stated, previously, that the key to the understanding and control of behavior is to be found in the past behavior history. The significance of the past behavior history in skills has already been touched upon.

Now we come to consider the past behavior history that extends far back into time from the present individual whose behavior we wish to understand or control. The instinct-patterns are a record of the hundred or more million years of animal life. The vague, ill-defined urge to act in certain ways common to the race are probably carried in the portion of the instinct-pattern which is concerned with the ductless glands and the autonomic nervous system. The adult human being is seething with desires, passions, and inclinations which he only vaguely understands; but still these are what lead him on to action; why, he knows not, but still he feels that he must!

The instinct-patterns present certain advantages in facilitating the control and prediction of behavior. In the first place, instinctive activities of a given sort are **common to all mankind**; black or white, tall or short, and to a certain extent male or female, all have common desires, inclinations, tendencies to behave in a manner fairly uniform from one person to another. One can be relatively certain of the past behavior of the race, but it takes a long period of close observation to understand the rôle of the past behavior history of any given individual.

Instinctive action is quick. It takes more time than reflex action but much less time than for reasoned action. Instinctive actions are commonly performed with but **little reasoning**. One does not reason whether one should fall in love or not; one just goes ahead and does it, head over heels, usually. The highly skilled pugilist may reason, as he deals out his offense and defense in the ring, but when the instinctive activities of fighting are aroused in the untrained person, reason and discretion are thrown to the winds.

Man, also, lives a somewhat coöperative existence. In Man this group of instincts centres around what is called *gregariousness*.

Then, too, it is quite probable that unseen and only vaguely realized instinct-patterns are back of a preponderance of our daily activities. They furnish the secret springs of conduct.

INSTINCTIVE BEHAVIOR IN MAN

We will now pass in review the chief instincts found in Man and take up some practical ways in which they may be appealed to in controlling the behavior of others.

It is customary to divide the instinctive activities of Man into three groups, namely, those centring around the preservation of the individual, those centring around the preservation of the race, and those centring around the preservation of the social group.

Instinctive activities centred around **preserving the individual** are such as seeking food, flight when in danger, fighting or pulling hair when in a desperate situation. The **preservation of the race** is accomplished largely through the sex and parental instinct-patterns. Reproduction centres around the sex instincts. The caring for the young during their period of helplessness is due to the parental instincts. Gentlemen's interest in advertisements for ladies' hosiery is another form which these instincts may take.

Oftentimes the instincts are apparently modified by certain habits; at any rate, their outward manifestations are from time to time veneered over by conventions or past personal behavior histories. One might follow the advice of *Life* and "obey that impulse"—but it might be rather embarrassing to do so on the ward or in the surgical amphitheatre. The maternal instinct, also, is sometimes manifest just exactly in the opposite way from which one would expect, especially in unmarried maternity patients. But in cases such as these, one is dealing with altered instinctive trends, which will be understandable in the light of the chapters which follow. Maiden ladies, who have no outlet for their natural maternal instincts in the usual form, may adopt a canary bird or a whole houseful of cats upon which to bestow their affections.

Now, after this short digression, back to the third group of instinctive activities—those centering around the **preservation of the social group**. Some insects, such as ants and bees, live a co-operative existence. The existence of the group is dependent upon



Courtesy American Red Cross

FIG. 39.—The Greatest Mother in the World appeals strongly to native instinctive equipment. It is more forceful than reams of financial arguments. Loaned by Lakeside Publishing Co., New York.

a certain social cohesion. Consequently some of the activities of each individual must be directed toward preserving the group, regardless of any possible disastrous outcome to the individual.

One seeks the company of his fellows. Solitude, which cuts one off from contact with his fellow-men, plunges one into dire distress, being snubbed by one's friends brings abject misery. The torture of the rack and pinion is not to be compared with the torture of solitary confinement.

The examples given above show the strength of the social instinctive activities on their negative side. On the more positive side we find Man organizing clubs that he may associate with jolly good fellows. Or woman joins the sewing circle, or forms a neighborhood club at which human beings may come into contact with human beings. Walking to the crowded thoroughfares and inanely mingling with the crowd is another manifestation of these activities. Neither does one relish a meal in solitude; congenial companions at the table are the best appetizers. But it is not just enough to be *with* others, one wants to be *like* others, to be approved by others. New clothes are purchased before old ones are half worn out because one wants to be in fashion, up to the minute, in the swim.

APPEALING TO THE INSTINCTIVE ACTIVITIES

It is to the instinctive equipment of mankind that one should appeal in getting action and agreement out of others. Advertisers have found this is what they must do; all those who want to control the behavior of others, whether getting them to do something for you or to agree with you, will also find it to their advantage to make a definite capitalization of Man's instinctive equipment in engineering the human element.

The instincts do not manifest themselves in a rigid and inexorable manner in mankind. There are minor variations continually occurring. The Maiden Lady may detest the unspeakable male who swears and is dirty around the house, but still just adore music by male quartettes. The sex instinct is being manifested here as frankly as in "A Skin You Love to Touch."

This somewhat generalized exhibition of instinctive tendencies gives one some latitude in appealing to the specific instinct-patterns.

The pleasant nurse, for example, is not merely likeable and radiating the gospel of happiness—there is also an indication of social approval in her smile. Thus she appeals to the group of social instincts and, to some extent, to the second group of instinctive activities as well.

The patient who dreads an examination or an operation will be prepared for the ordeal when told that it means a quicker return to home and home folks. To be told that it has to be gone through with anyway, so why worry, merely irritates an already touchy spot.

Attractive china, a flower on the tray, and savory food may not stimulate the anorexic patient to eat. But

this, *plus* a well-liked friend or the presence of a favorite nurse, at the meal hour, may be an irresistible combination. This is one of the reasons why the ward trays return to the scullery with less refuse than do the trays from the private rooms.

These are only a few random suggestions regarding the appropriate manner of making an instinctive appeal. The serious nurse



Courtesy American Red Cross

FIG. 40.—This poster touches off tender emotions by its appeal to the maternal instincts. Loaned by Lakeside Publishing Co., New York.

may obtain further suggestions by carefully analyzing the instinctive appeals made by especially effective advertisements. There is a wealth of suggestive material contained in the national advertising. There is a vast field for the physician or the nurse to use the same instinctive type of appeal in their daily activities. A few words of approval, whether merited or not, will seal an allegiance that makes the approved a slave to the nurse. Cutting remarks undo the best therapy.

TOPICS FOR DISCUSSION

1. Are instincts more closely related to reflexes or skills?
2. What instincts are active in making the hermit, the social butterfly, the motherly nurse, the political radical?
3. The ripening of what instincts made Booth Tarkington's Penrod interesting and amusing?
4. Do ducks swim instinctively? Do chickens? Does Man?
5. Do patients instinctively dislike bitter medicine?
6. What instincts would you appeal to in the young man patient who takes pride in being a hard-boiled specimen of humanity? In the usual successful business man? In the society matron? In the flapper? In the retired farmer? In the widow with three children?
7. People instinctively manipulate, or play with, watch-fobs, hair-pins, broaches, purses. Would you appeal to this instinctive manipulation in breaking the monotony in a sick room?
8. What are the strongest instincts in making people work?

CHAPTER XIV

ENTER THE VILLAIN

Variability in Human Behavior—Society Standardizing Human Behavior—Obstacles to Behavior—Society as an Obstacle to Variable Behavior—What Happens to Repressed Activities—The Energy of Mental Activities.

PROMINENT so far in our study of human behavior have been unlearned and learned actions; actions that are invariable from person to person, and actions that are characterized by more or less variability. The unlearned, invariable actions we have found to be due to the past behavior history of the race. The learned, variable reactions have their formation in the past behavior history of the individual himself. It is largely through the presence of intermediary neurones that the variable responses are made possible. Man has by far the richest supply of intermediary neurones of any living organism. Man's behavior is also more variable for this reason.

The main activities of all organisms consist in making changes or adjustments which will make that organism better adapted to live in its environment, or in adapting the environment to the needs of the organism. In the lower animals, the adjustments consist in the main in the organism itself being modified; in the higher animals, such as Man, the environment may be adapted to the needs of the animal by the animal itself. In winter-time, the coat of the furry animals becomes thickened, while Man builds a shelter and stokes the furnace. The significant features of this adjustment between organism and environment is that if these adjustments are not wisely made there is grave danger of the organism being destroyed, or living a disgruntled existence.

In the lowest forms of animal life, the principal adjustments between the organism and its environment are those involved in

obtaining food. Such is the case in our old friend with whom we began the study of behavior, the amœba. It will be recalled from chapter three that the amœbæ secure their food by surrounding a particle of food material which is gradually absorbed into their protoplasm. They are able to distinguish poisonous materials or other influences which might be harmful to their protoplasm. They avoid swimming into places where there are extremes of heat and cold, they absorb desirable food and reject the undesirable. That is about all there is to their daily routine. Rather a monotonous life they live, perhaps, but it is the simple life, with not very much opportunity for the organism to get out of adjustment with its environment. With all its monotony it is a well regulated existence.

In these small animals composed of a single cell, the adjustments to the environmental forces are accomplished principally by the action of simple mechanical and chemical forces. The amœbæ have no nervous structures at all. Their reactions are mechanochemical or tropic.

But as the animal scale is ascended and more complex forms studied, other factors are found to enter into the daily behavior of the organism. The food reactions which are the chief ones in the amœba come to be supplemented by reactions through which the individual organisms are enabled to avoid their enemies. This may be a further development of the type of reaction by which the amœba avoids dangerous chemicals and moves away from extremes of temperature.

Thus with the increasing complexity of animal life and the appearance of nervous tissues the adjustments of which the animal is capable become increased in variety and complexity. When an amœba finds itself in an extremely cold environment it starts travelling, and keeps going until it finds a more comfortable temperature. It trusts almost entirely to luck. Its behavior is characteristically *trial and error* and bears that name. In Man, however, it is much different. When he notices a lowering of the temperature which is uncomfortable he closes the windows, or puts on heavier clothing, or turns on the steam, or builds a fire on the

hearth. He does not run around aimlessly in a circle as does the amoeba. He might be able to keep warm by doing so, but that is not the most intelligent way for a human being, capable of a wide variety of adjustments, to respond. If he did respond in such a manner his friends would be justly concerned about his mental condition.

This increase in the adjustments of which the higher animals are capable makes it possible for man to react in a variety of ways, and intelligently, to his environment. His behavior is not entirely trial and error but is frequently preceded by thought or certain mental reactions. This means that there arises the necessity to choose the most appropriate adjustment from a variety of possible reactions. The mental factor back of behavior thus comes to play an important part in the behavior of the higher animals and has its culmination in Man. Accordingly healthy living, efficient living, demands not only a sound, healthy body, but a mind that functions well to guide the body properly in its daily functions. Mental well-being is desirable for the influence which it has upon our bodily efficiency as well as upon our happiness and joy in living.

OBSTACLES TO BEHAVIOR

Man takes pride in being an intelligent animal; his behavior is characterized by a wider range of adaptability than that of any other living organism. But just as a complicated piece of machinery has more parts to get out of order, so with a complex and fully developed mental life there are a large number of pitfalls in its daily operations. With this variety of possible adjustments there comes a **conflict** as to the proper adjustment to make. The instinctive response might be to go after your enemy with rough fistic methods. But, there is an inner opposition to this method, since the enemy may be larger and more powerful; or it may be the moral question of fighting.

This is just one example of how the conflict over possible modes of action may arise. These conflicts are ever present, and in Man it becomes necessary to adjust, not only to the outer

environment as the enemy, but to the inner condition of conflict. In order to understand modern psychology sufficiently for an application of it in our daily dealings with our own behavior and the behavior of others, it is essential that certain types of common conflicts be comprehended.

Man's daily activities are concerned primarily with the satisfying of certain wants. Hunger and thirst must be satisfied, the



FIG. 41.—Diagram showing the predominance of variable behavior as the animal scale is ascended. The shadowed portion represents invariable behavior; the unshaded portion the variable. In the higher animals such as Man the variable behavior is far in the lead. (After Herrick.) Courtesy Lakeside Publishing Co., New York.

body must be kept comfortable. If he desires, friends are visited, he attends the theatre, he takes his family on an outing. If he wants to work he works; if he wants to loaf, he loafs—provided he can still obtain food. But a conflict may arise; he may not want to work, but still it is necessary to labor if a living is gained. Or he may not be able to go to the theatre, because all of the seats are sold out,

or because it cannot be afforded. Man is continually and eternally in conflict between desires and ways of meeting these desires. Some of them may never be realized, others can be achieved only partially. Some tendencies to action have to be repressed in favor of actions more approved by society.

It is quite apparent that not all of the wants or desires of Man are fundamental for his existence. Some desires are actually opposed to this, as, for example, the desire to hurl oneself from the top of a skyscraper. Some of them are absolutely necessary to preserve him and the species, however, and these are known as **fundamental wants** or trends. Such fundamental wants are the

quest for food or the provision of food through labor. It is also fundamental to protect oneself against danger, to rear a family that the family name and the species may be preserved. These fundamental trends are inherited, inborn; Man does not have to pause and think to feel the need. They are given to the central nervous system through the mediumship of the autonomic nervous system and the ductless glands.

It is not always possible for these fundamental trends to be realized. Thus there arises a conflict between desire, or need, and reality. One's food supply may be threatened by a period of unemployment or by the inability to hold a job. Nature or the wiles of matrimony may make it impossible for one to rear a family. It is in overcoming and making the most beneficial adjustment to these conflicts that we have the test of a healthily adjusted organism. Certain character traits or personality traits have their basis in these adjustments of the individual to conflicts. Compensated temperaments, which were mentioned in chapter eleven, are caused in these adjustments. Apparently obscure psychopathic conditions quite frequently also have their basis in the adjustment to situations such as these.

SOCIETY AN OBSTACLE TO VARIABLE BEHAVIOR

Certain tendencies to action have to be repressed by the very construction of the organism; one cannot run forward and backward at the same time, neither is it possible to faint and fight at the same time. By far the greatest amount of repression, however, is due to the fact that as human beings are now living together in society, it becomes necessary for certain regulations to be set up over the behavior of the individuals in the group. It thus becomes essential that one repress certain types of incipient behavior which would be pleasing and satisfying to himself, but still against the best interests of the group. He might get his meals by raiding other people's ice chests, but the other fellow promptly sees to it that such behavior is promptly repressed or restrained by the law.

Only a part of these regulations set up by society are in the form of federal, state, and municipal laws. There are a plenty of these,

and many of them carry drastic penalties. But these are only a part, and a small part at that, of the total external regulations placed upon the behavior of human beings. An habituated criminal scorns the laws of the government and their penalties. He will risk his life in violation of the laws to secure a few dollars or a few moments' ill-gotten pleasures. But would the same person violate the code of honor which is a part of the etiquette of criminals between themselves? Hardly. He laughs at and detests the formal laws established by the duly authorized legislative bodies—but the esteem of his fellows in crime must be kept at all costs. So long as he retains the approval and favor of his fellow criminals, he will shoot to kill at every legal officer who attempts to enforce the written laws. But if he once loses the clannish esteem a "trip over the road" and a few years' imprisonment is much to be desired in preference to being cast out among his friends.

It is gradually becoming apparent that many tendencies to action are repressed through purely social regulations, as contrasted with the written law. There is no law prohibiting one from attending a formal affair clothed in a checkered suit, a yellow shirt, a red scarf, and a slouch hat. But who is going to attend so arrayed even if it is within the law? Why do men tip their hats when they pass a lady acquaintance on the street? It is not required by statute. Or why do not people eat with spoons entirely? It would be much more safe and speedy than the methods commonly used. There is no law prohibiting young ladies from remaining out unchaperoned after midnight; but still they do not remain out so late—very often. If they did, the neighbors might talk. In other words, here we find Mrs. Grundy is exerting a powerful influence over people, which causes them to repress certain forms of behavior.

Implicit behavior, such as thoughts and wishes (see page 119), is repressed daily. Mrs. Grundy also seems to have branded lustful thought, as well as lustful actions, among the sinful things. So many times they are crowded out of the mind as it were. Repression is as prevalent in implicit behavior as it is in explicit behavior, such as running, talking, and the like,

WHAT HAPPENS TO REPRESSED ACTIVITIES

Is there any practical significance to this repression of tendencies to behave in a certain manner? Indeed there is. In order to fully appreciate this, it may be necessary to unroot some very popular but also very unscientific conceptions regarding behavior and mental life.

First of all, it is well to realize that one's behavior is dependent not alone upon the nervous system or the brain but also upon the proper functioning of other parts of the bodily organization. It has been said that one loves with the thyroid and hates with the adrenal. The mental changes in certain forms of bodily disease are commonly observed as witnessed by the optimism and the cheerfulness of the patient with pulmonary tuberculosis or the anxiety of the patient with exophthalmic goitre. And who can be a cheerful companion atop of indigestion? Detailed research is fast accumulating which shows in more and more detail the part played by the endocrine glands and the autonomic nervous structures in the behavior of human beings. The rôles of these vegetative functions have already been briefly set forth in earlier parts of this book.

So, if we insist upon retaining the term mind as descriptive of what psychology studies, **we cannot limit the mind to the brain** or to any part of the nervous system. The human body works as a delicately interrelated machine. The ancients were as justified in locating the soul in the pineal body as psychologists a half century ago were in locating the mind in the brain. It may seem rather unpoetic to be told that the intestinal and genito-urinary tracts perhaps have as much to do with the mental life as does the cerebral cortex. Not a noble poetical thought, perhaps, but such is the trend of scientific findings and opinion.

Next, we must take up the matter of chance behavior or chance mental states. It is popularly thought that one mental state follows another largely as a matter of chance. Such is far from being the case. Cause and effect is at work in one's mental life just as surely as it is at work in chemistry and pathology. **There is always a**

definite cause for any mental state or given bit of behavior. Ideas follow after one another according to certain laws of association; tables have been prepared showing the associations that are normal and those that are abnormal. Even the bizarre mental states of the dream or of the delirium are explainable in terms of the past behavior history of the individual.

THE ENERGY OF MENTAL ACTIVITIES

The mental life of living organisms does not run on nothing or out of hot air. Definite nerve changes are present every time nervous tissue is used; electrical changes are set up, carbon dioxide is liberated, the Nissl granules in the cell body are found to disappear when use is made of the neurones. Severe so-called mental strains bring about changes in the tissues of certain internal organs. Certain articles of diet are essential that the chemical stores of the neurones may be renewed after being exercised. Certain drugs cause characteristic modifications of one's mental life; the anæsthetics produce a loss of sensations, opium produces ecstatic dreams, alcohol produces well-known changes.

Something quite analogous to, if not identical with **the laws of the conservation of energy is at work here.** This is an important point to be remembered. Thoughts do not come out of nowhere, even though it may seem so to the observer. They are not the result of the action of some "spirit," but are to be explained in terms of cause and effect. In old fashioned psychological terms this is the association of ideas. One far-reaching implication of this energy concept of mental life is that **every mental state has meaning in terms of the mental states which have preceded it;** every bit of behavior is understandable in terms of the behavior which has preceded it.

Another result of the application of the energy concept to the study of behavior is that the incipient actions which are repressed must naturally be expected to be **converted into some other form of behavior.** This is exactly what occurs. In the lower forms of

behavior such as the spinal reflexes, Sherrington has observed, what he calls "spinal induction." In this, the inhibition of an incipient reflex action results in its later increased force and duration.

Repressed tendencies to action are also converted into other types of behavior at a higher level than the simple reflexes. They serve as the starting point or as the generator of certain so-called **mental mechanisms**, which attempt to evade or get around the repression in one way or another. Especially is this true in the case of actions or thoughts which are emotionally tinged. One's emotional states are accompanied by far the greatest manifestation of bodily energy of any of the mental states. Witness the marked changes in facial expression, circulation, and respiration which accompany fear or joy. The bodily characteristics of the more intense emotional states will be recalled from chapter twelve. Many writers consider the emotions to furnish the drive or energy back of the entire mental life. At any rate, our mental life is always tinged with a little emotional coloring. Thoughts are usually pleasant or unpleasant, very few are neutral. As a rule, it is the unpleasant ones that are repressed; and that is not the end of the trouble but just the beginning of it.

It is one of the ironies of Nature that many of her apparently strongest and most useful structures are really incipient pitfalls. Such is the case in the behavior of mankind. Graced with a complexity of nervous structures that provide for a wide variety of conduct and thought, these come at the same time to bring Man very frequently face to face with the realization that only certain of the impulses to action can be carried out. In this conflict between possibility and reality, certain tendencies to action or certain incipient actions have to be done away with; but the energy back of them cannot be annihilated in so easy a manner. Like John Brown's soul, this goes marching on. And just what happens to it is of the utmost importance. We turn to it immediately in the following chapter, where we will see it at work determining the formation of little personal characteristics and actual insanity.

TOPICS FOR DISCUSSION

1. Was your behavior in applying the first roller bandage "trial and error"?
2. What are some of the causes of repression around a training school?
3. Make a list of the wants that you have felt keenly within the past week. How many of them are fundamental?
4. What seems to indicate that the autonomic nervous system is active in conflict and repression?
5. What are some of the needs that the patient must repress?
6. Can the nurse provide a substitute for these needs?
7. Make a study of the repressions that must be made by the expectant mother.

CHAPTER XV

HOW BEHAVIOR INDICATES MENTAL ACTIVITIES

Trivial Things—The Secret Sources of Thought—Dreaming—Physiological Compensation—Mental Mechanisms—Mental Compensation—What Projection is—Rationalization—Flight from Reality.

DID you ever stop to consider why you cannot eat Irish stew ; or why you detest Douglas Fairbanks ; or why you never wear black clothing or a bishop collar ; or why you voted for Wilson because he kept us out of war ? Do you understand your likes and dislikes ? Or do you take them for granted ? It is usually well just to take them for granted and give thought to more serious things, but such simple mental activities as these are indices to what is taking place underneath one's superficial behavior.

In chapter thirteen it was stated that just such things as these we have enumerated, have their origin in the repression of certain inclinations to act which must be repressed through conflict with desires or through actual conflict with laws and social regulations. It is rather treacherous ground to cover, for one does not knowingly struggle to get around these conflicts, as one does to get out of a cage in which he has been imprisoned. Most of the adjustments to conflicts of various sorts take place in one's mental life without being let in on the secret, as it were. The decision is made or the action selected in deeper strata of the mental life than one is usually aware of.

Fortunately, in a goodly number of cases, it has been possible to study certain type cases, which illustrate quite definite ways in which one unconsciously attempts to get around certain conflicts. We will now turn our attention to some of these cases. It is well to bear in mind that these are not simple illustrative cases—they are actual cases. Many of them have been gleaned from medical and psychological literature, some are personal observations, others

have been kindly communicated to me. They are not at all uncommon. They have been selected because they illustrate, in a clear cut way, the various types of behavior which may result when one attempts to get around a conflict. Some of the cases show how repressed tendencies to behavior may be distorted and changed in their final expression.

THE SECRET SOURCES OF THOUGHT

The way in which **repressed tendencies to activity** influence one's thought, unbeknown to the thinker, is well illustrated by **day-dreaming**. In the day dream, the physician sees a speedy cure effected in a difficult case; the conflict between the desire to bring about a cure and the thought that to do so will be perhaps impossible, leads to a resolution of the difficulty in the day dream. Or the love-lorn maiden may day dream herself into the admiration of Eugene O'Brien. Some day dreams plainly represent the adjustment of the thought of the dreamer to repressions. In other day dreams the adjustment is still there, but more difficult to determine.

Dreams of sleep also represent another adjustment of one's mental activities to these unknown repressions. The child who was refused candy, dreams that he has a wheelbarrow full of sweets. The student who is worried about the outcome of an examination, dreams that he has passed with honors. The adjustment to repressed activities (implicit behavior, page 119) in these dreams is fairly obvious. But it is not all such clear sailing. Many dreams seem to have no basis in any conflicts; they are such a jumble of images and apparently meaningless scenes that they seem to have no relation at all to the waking mental states. But behind all the fantastic dream activities there are some repressed activities that are surging and seething and causing all the distortion of the dream. The meaninglessness of the dream clears away when the past personal behavior history is understood; this gives meaning to the most foolish dream.

The meaning of night dreams is usually hidden away through **an attempted disguising** of the real significance. Friends, who are large, appear in the dreams as pigmies, people walk backwards

instead of forwards. There is still meaning back of all this triviality, however. And there are also some repressed tendencies to act back of the dream activities. The following case given by Dr. H. W. Frink¹ illustrates this point beautifully.

"An acquaintance of mine once dreamed that he was kicking a skunk, but that animal, instead of emitting its usual odor, gave off a strong smell of Palmer's perfume.

"This dream of course seems absolutely absurd and meaningless. But we must remember that, as yet we know nothing of the dreamer, nor of the setting in which the dream occurred." In other words, we are still ignorant of the personal past behavior history which is needed to give meaning to this apparently absurd and ridiculous dream.

"In discussing his dream with me, the dreamer, whom we may call Taylor, was reminded by the idea of Palmer's perfume that he had been employed as a clerk in a drug store at the time the dream occurred. This brought to his mind the following episode, which, as will be readily seen, was what gave rise to the dream.

"There had come to the drug store, one day, a man who demanded ten cents' worth of oil of wormseed (*Chenopodium*), and, as this drug is not classed as a poison, Taylor sold it to him without asking any questions. The man then went home and administered a teaspoonful of the oil to his six months' baby. The child vomited the first dose; a second was given and thereupon the child died. Then, instead of taking the responsibility upon his own shoulders, the father sought to blame Taylor for the child's death. The town in which the occurrence took place was a small one, and in a day or so most of the inhabitants had heard his very untrue account of the affair. Then Taylor, who was naturally quite unwilling to be thus exposed to public censure, sought to defend himself by setting forth *his* version of the matter to every customer that entered the store. In a few days, the proprietor, annoyed by this constant reiteration, said to him: 'Look here, Taylor, I want you to stop

¹ This case, and several of those which follow, I have taken from his book *Morbid Fears and Compulsions*. This book is not nearly so morbid as it sounds. It is a very worthwhile and interesting book to read.

talking about this affair. It does no good. The more you kick a skunk, the worse it stinks.'

"That night Taylor had the dream that I have related. It is not difficult to see why it occurred and what it meant. By the proprietor's command, Taylor had been robbed of the only means at his disposal for squaring himself with the public." There had been a repression of the activity. It had cropped out later in a dream, but in a somewhat disguised and rather absurd form. And it should be also noted that the experience which was repressed was a rather unpleasant one.

Repressed activities also break forth from time to time, not in day or night dreams but in **lapses of speech**. This is illustrated in the case of the two women who were passing a drug store. The one had a sick child at home and stopped to purchase some Castoria. Outside of the store, before entering, she said to her companion: "Wait a few *movements* for me." Of course she had intended to say moments rather than movements. This slip of the tongue was not purely accidental, it was made unconsciously, but the wrong word had a definite meaning in the light of the mission on which the woman was entering the pharmacy.

Apparently **chance action**, as well as chance slips of the tongue, are also not without meaning. This is shown in the instance of the elderly married couple who were dining. The wife had a stomach complaint and was on a limited diet. The husband requested his wife to bring him the mustard for use on his roast. Instead, and entirely unaware of her error, she brought him the bottle of her stomach medicine, which bore not the slightest resemblance to the mustard barrel. The meaning of this rather ridiculous action is easily seen in the light of her repressions.

THE NATURE OF COMPENSATION

When one kidney is removed from the body the remaining organ takes over the functions formerly performed by the one extirpated. This is commonly accompanied by an increase in the size of the remaining kidney. In other words, there is a **compen-**

sation taking place to make up for the loss of the other. The loss of parts of the body may also be compensated for, not by another organ assuming increased functional duties, but by a compensation in the mental activities. The **feeling of inferiority** of Kaiser Wilhelm, due to the paralyzed and withered limb, was compensated for by his coming to believe in his all powerful and controlling powers. The cynical, self-satisfied, haughty attitude of the cripple is oftentimes a compensation for his inferiority. College students who rank low in their work, compensate by assuming that they are unusually bright, better than the average student, but that they do not care for the marks they may receive in their studies, because their professors are very dull, and do not interest them in the least.

Dr. Frink relates the case of a young married woman who was surprised to find herself experiencing an intense disliking for all light-haired, blue-eyed young men. This aversion was very intense and she was unable to account for it unaided. After a thorough examination of her past behavior history, Dr. Frink found that before her marriage she had been very much attracted by a male cousin, who had light hair and blue eyes. Her married life had not brought her the happiness which she had expected. She would like to leave her husband and return to her cousin lover. But, of course, this had to be repressed. She was bound by laws and social standards to her present husband. Any other tendencies to behave in a different manner must be repressed. So this repressed tendency to action became distorted and changed into just the opposite of what was really the meaning. The emotional tone was altered from liking to disliking. Notice that, again, we find that it is emotionally colored activities that will not be downed; they crop out again and again; they are not removed from all influences upon our behavior or mental life by being repressed or denied.

With this young woman, it is much as if she were trying to make amends for unapproved likings. But, of course, the reasons for her dislikes were entirely unknown to her at the time. Dr. Frink had to study with her her past behavior history before the meanings became cleared.

It is important to be remembered that this compensation takes place **without one knowing what has gone on**, much like the manner in which digestion and respiration take place. The college student who does poor work and then develops an attitude of superiority, does not know why he has assumed that attitude. He is kidding himself along rather than anyone else. This is important to be remembered. It is all the more important when followed by the statement that most of one's likes and dislikes, especially the more intense, are probably due to compensating mechanisms of which we are usually not aware.

This so-called *mental mechanism* of compensation is very common. At times, it determines the characteristics of groups of people. The chivalry of the romantic South, which is unfortunately passing, was largely a compensation. Women were honored, feted, toasted, and their honor defended with the sword—but the slaves were chained, beaten, cursed, and their honor violated. The chivalry was a compensation for the brutality and oppression.

In its extreme forms compensation may result in **manic-depressive mental disorder**. In its milder forms it may result, as has been stated in likes and dislikes, in the anti-vivisectionist, in the prohibitionist, or in the social reformer, all of whom are fighting what is really strongest within themselves rather than a sin of society. There is no distinct line of demarcation between compensation in its usual and more normal form and compensation in mental disorder. The range passes gradually from one extreme to the other, at no one point can it be said that here the normal is separated from the pathological.

WHAT PROJECTION IS

Closely akin, but distinctly different from compensation is the mental mechanism of **projection**. Projection may perhaps best be illustrated by another of Frink's cases. This is a woman who lived in a small village. She was left a widow, by the death of her husband, before her years of decline had set in. She soon complained that the villagers were talking about her. In particular, she accused them of saying that she was a "designing widow."

Now as a matter of fact, her neighbors had been saying nothing of the kind, in spite of the fact that it was a small village. But a study of her past behavior history indicated that she was *in fact* a designing widow. The desire to remarry had been repressed. But that was just the beginning of the trouble and not the end of it. She had not compensated for this repressed tendency to action by forming an aversion to all marriageable men; instead a *projecting mechanism* was at work. Her repressed tendencies to action had found an outlet in the projection into the imaginary remarks of others.

This is the mechanism operating in the production of delusions; the persecuted paranoiac is persecuted largely by his own projections. The political radical and the chronic fault-finder who see no good in anything, do so

simply because, so far as they can see, there is but little good within themselves. This does not mean that there is no good there, they simply fail to see it. Talking up the personal almightiness of the political red will do more to alter his political notions than acres of arguments on the topic of politics and government.

This mechanism of projecting repressed activities, is common in the daily behavior of everyone. The tennis player who blames his poor playing onto the sun, or the racket and balls, is projecting. His own difficulties are projected into other objects. A few moments ago, as I was typewriting this manuscript, I swore at the typewriter for an error which was obviously due to my own carelessness. I like to escape the unpleasant fact that I can not make my fingers go as rapidly and as skilfully as I would have them.



FIG. 42.—Sitting in almost endless worry, due to poor mental adjustments to conflicts. A patient with a manic-depressive psychosis. Courtesy Lakeside Publishing Co., New York.

As a rule, the faults we find with others oftentimes lie within ourselves. Here, again, unless specially trained in psychology, one is not aware that the scurrilous criticism which he makes gives much insight into his own inner estimation of his personal faults and weaknesses. Those things which we fight and repress within ourselves are later projected into others—the pent up energies must find some outlet.

RATIONALIZATION

Rationalization is a big word for about the commonest thing in life. It has probably been noted, as these few cases have been reviewed, that the real motives for a large portion of our daily behavior lie hidden from us. Such is really the case. And at first, it may be difficult to accept this; but it is absolutely necessary to; the other notions must be repressed or put to other use.

It is commonly thought that human beings are always aware of why they do certain things; it is usually taken for granted that mankind is rational. Well, perhaps it is—occasionally. It will be recalled from chapter four what we said about reasoning in Man and beast. Man can reason; but he does little of it. Most of his acts are motivated by repressed behavior which has formed a nucleus of energy, as it were, or what has been termed a **complex**. These **hidden complexes** rather than rational motives **are back of most of one's behavior.**

Still people persist in ascribing conscious motives to their acts. These attempts to explain away the real significance of the behavior, which is usually unknown to the person at the time, is called **rationalization.**

Such was the case with the woman who crossed the street at a certain point "to be out of the sun." Now this might be a perfectly good reason for crossing the street, but a skilled psychologist found out that, in this particular case, the real motive was that some time previously she had been frightened by a dog at this

place, and the repressed, painful experience was at the base of a complex which prompted her to cross. We may be certain that a chicken will cross the street to get on the other side, but goodness only knows why human beings may cross the street. And one might as well ask the old hen as the human being and expect to obtain the real reason.

The reasons people give for clinging to certain religious beliefs, swearing allegiance to certain political parties, or justifying the



FIG. 43.—The most extreme form of flight from reality is found in the patient with dementia præcox. He will sit huddled in a corner and apparently neither hear nor see anything that takes place. Courtesy Modern Hospital Publishing Co.

purchase of certain articles of clothing are largely nothing more than rationalizations. One should openly recognize that there is no adequate conscious motive for much of our behavior and let it go at that. Not that one should consider himself irresponsible, but rather refrain from creating fictitious reasons, which really fool ourselves more than anyone else. As Dr. F. L. Wells says ² “one should stick close to rules of conduct and not be governed by rationalizations.”

² In his book *Mental Adjustments*.

FLIGHT FROM REALITY

When one does rationalize, it is little less than a **flight from reality**. This is found in its extreme forms in patients with **dementia præcox**, where they have withdrawn from all contact with the outer world. They live in a world of imagination, of mental phantasy. In the actual world, they might suffer many rebuffs and repressions; but in their little mental world, in which they live alone, things can go just about as they would like to have them. The unpleasantness of the external world is overcome by seeking satisfaction within their own mental creations.

This same tendency is found in certain individuals, who are not yet afflicted with the mental disorder *dementia præcox*. These are the people who have what has been termed the **shut-in character**. They are the people who are seclusive, do not mingle with others, have and care for few friends. They do not meet their own difficulties and inferiorities openly or by compensation; instead they indulge in day dreams, rather than in contact with the world as it is. This is just the opposite of projection, and may be termed **introjection**. The repressed activities are not compensated or projected, but find an outlet in self-satisfying day dreaming, and a miserly intellectual existence within the world of imagination.

We retain for the two following chapters further mechanisms which are of immense importance for physicians and nurses. The first chapter following will take up the relation of these so-called mental mechanisms of a certain type to apparent bodily disease. The second chapter following on "Use and Waste in Thought" will bring to a head the many practical indications, both personal and in the sick-room, which lead from these last few chapters.

TOPICS FOR DISCUSSION

1. Is day-dreaming active or passive thinking?
2. Is day-dreaming common among patients? What can the nurse do to avoid day-dreaming on the part of the patients?

3. How would you interpret the dream that the patient had of having recovered and gone home?

4. What would you infer if the patient dreamed that her husband died, in spite of the fact that she seemed to be devoted to him?

5. Try to find the hidden meaning in a bizarre dream that you remember distinctly.

6. Is there any basis in fact to the interpretations given in the old-fashioned "Dream Book"?

7. What have you unwittingly compensated for mentally lately?

8. Watch other nurses when they are criticising the patients or the superintendent. Try to figure out how much of the criticisms are projections.

9. The next time you catch yourself explaining why you neglected to change dressings, or anything else for that matter, write it down and analyze it as a rationalization.

10. Is day-dreaming similar to flight from reality? How?

11. If you were very certain that a patient was projecting, what would you do?

CHAPTER XVI

MENTAL ACTIVITIES AND BODILY AILMENTS

“Putting on” an Ailment—Hysteria—Does the Mental Become Bodily?—A German Sailor—Conversion—Case of an Eleven-year-old Girl—Is the Bodily Ailment Intentionally Faked?—Malingering—Shell Shock—Psychoneuroses—What to Do with these Nature Fakers—Persuasion—Suggestion—The “Talking Cure.”

It is not uncommon to hear it said of a patient, “She is putting a lot of that on. She is just working for sympathy.” That is a rather unkind thing to say, but perhaps it is not without basis. Just what grounds there are for believing some patients put on a lot of suffering and ailments we shall find, after some ground is cleared away in the next few paragraphs.

In the last few years of the nineteenth century a small group of physicians became interested in the causation and treatment of the affliction known as **hysteria**. This is a condition which has been recognized for centuries, and still had remained obscure and misunderstood. Hippocrates, the father of medicine, attributed this ailment to the womb becoming detached from its moorings and wandering around within the body. But, when it was later found that men were as frequently hysterical as women, this picturesque explanation was rendered obsolete.

During all the centuries that have passed since the time of Hippocrates, or since the beginning of time in all probability, the so-called hysteric has been an unfathomable mystery—until the last few decades. Just what hysteria is, is still rather difficult to state in a few words. Briefly, hysteria is found in patients that present some *seeming* bodily ailment, while detailed examination shows that the bodily organs and functions are entirely normal. Popular language speaks of hysteria as in “hysterical laughter,” or uses the word to describe a person with a bad temper. The high-

spirited, high-strung, irritable person is probably *choleric* rather than hysterical. It is better to limit the term hysteria to those instances where the bodily disorder is seeming rather than real. They are the nature fakers, as it were.

Hysterical symptoms are of a wide range. The hysteric may have areas of skin **insensitive** to touch, although these areas do not correspond to any disturbance of sensitivity that takes place in genuine nerve lesions. The hysteric may seemingly have a **paralysis**, which does not identify itself with any known form of paralysis resulting from nerve disturbances. Hysterical patients may have **vague internal pains**, without any organic basis for them. Or they may be apparently **deaf** or **blind**; may say they have racking headaches; may complain of excruciating pains in the stomach, and smilingly convey information about the graveness of their disorder.

DOES THE MENTAL BECOME BODILY?

The main characteristic of the hysteric is that the bodily ailment is somewhat spurious; it is not true to the usual clinical form; it appears to be modified by mental activities. But does the mental life of the patient have anything to do with determining these bizarre symptoms?

A German physician by the name of Blässig reports the following case in the Munich Medical Weekly:

“A seaman from the *Derfflinger* was brought into a naval hospital with loss of voice on December 22, 1914, and could speak only in a whisper. He said that he had always had good health, with the exception that, as a child, he had diphtheria, but recovered without tracheotomy or any complication. His voice had always been clear and well under control. At the beginning of December, he had a slight cold, which he attributed to sentry duty on deck in very stormy and wet weather. While in the ammunition chamber of the big guns, he was greatly upset during the firing and suddenly lost his voice. After fourteen days he recovered his speech. On February 12, 1915, he returned to the hospital with complete loss of voice, immediately after the naval engagement in the North Sea. On

February 15th, he was treated with electricity, directly applied to the vocal cords, and on March 20th he was discharged with complete recovery of his speech. But on returning to duty, as soon as he went on board his ship, his voice was suddenly lost for the third time, and he remained aphonic."

In this case there is undisputable evidence that the loss of voice was not caused by physical forces, but rather by mental causes. Apparently, some mental activities become converted into bodily disorders. Everyone is familiar with this in his daily activities. The muscles of the arm can be brought under voluntary control for certain actions to be performed. If one desires to be stubborn one can seal one's lips tight and refuse to speak. Under mental excitement in intense emotional states physical injuries pass unnoticed, as in the case of the soldier who is absorbed in the charge which is being made and notices nothing wrong until the enemy trench is taken, whereupon he finds himself severely wounded. Then, at the other extreme, we have the child who fears punishment will be meted out to him and, accordingly, starts weeping over a barely perceptible scratch on the finger.

In these cases from daily life we have a wide range, from the rather intentional faking of the child to the sensory paralysis of the soldier during the charge. The former presents an apparently acute suffering; the latter presents a temporary destruction of sensitivity. Both are due to mental rather than physical activities. Both are also found, along with a host of other ailments, among the hysterical.

Throughout this practical psychology we have made no distinction between mind and body. But we have found that much of the mental life is due to the organic needs of the bodily systems, that the central nervous system is enslaved to the vegetative functions of the body. Mental states were found to be accompanied by energy transformations, not merely in the nervous tissues, but in other tissues of the body as well. So it is only entirely natural that we find mental activities prominent in the production of these numerous symptoms of the hysteric.

CONVERSION

The production of apparently physical signs and symptoms through the action of mental activities is called **conversion**. Conversion, as do also projection, compensation, and the other energy transforming mechanisms takes place without the person knowing what it is all about. So if we call the hysteric the great nature faker we must remember that hysterics fool themselves perhaps more than anyone else. That is why they are not to be ridiculed and detested; their sufferings are real to them and as unexplainable on the surface as they were to Hippocrates.

Conversion has its starting point with these repressed activities, just as do the other mechanisms of adjustment. The young married woman who had an intense disliking for light-haired, blue-eyed men, might have had the same repressed activities find outlet in conversion rather than in compensation. If such had been the case, she might have developed sexual frigidity, constantly recurring headaches and abdominal pains.

But we do not need to busy ourselves with stretching our imagination to produce a hysteric out of a woman who, in actuality, was merely not in love with her husband. There are plenty of authentic cases of hysteria on record that have had the rôle of the mental activities in determining the symptoms well established.

No more interesting and suggestive case can be found than one reported by Dr. Marion E. Kenworthy in addressing the graduating class of the United Hospital at Portchester in 1921. After stating that seventy-five per cent. of the cases the nurse is called upon to handle have their **physical diseases modified by these mechanisms**, she gives the following cases by way of illustration:

“An eleven year old girl came to the clinic with a complaint that, for the past two years, she had been nervous; each morning she was troubled with an intestinal upset and vomiting, which often made her so weak she could not go to school. The child was evidently dependent upon her mother, cried when asked to enter the examining room, and clung to the mother’s hand during the interview. The

father was dead; the mother, the patient, and a brother fourteen years of age, lived in a small apartment, the mother earning a livelihood as janitress and washwoman.

“The child had always received a good deal of attention from the mother, who was oversolicitous and extravagant in the affection which she showered upon the child; this tendency could be explained on the basis that the lonely woman found, through the medium of her children, a course of emotional satisfaction. (Sublimation; see following chapter.)

“On questioning, it was found that the child had always slept with her mother. She habitually remained up until the mother retired, because she was frightened of the dark. The mother was unwilling to allow the child out of her sight, always accompanying her to school. When the child vomited, the mother became much upset, was very solicitous and more attentive. The child talked freely of her past experiences, of her love for her mother, etc. It was felt that the present symptom complex was largely the result of an unconscious infantile wish to remain with her mother, and because of this, the first step in the treatment should be along lines which would tend to free the child from this fixation. The first point of attack, naturally, would be to assist the mother to gain a new point of view.

“The new approach met with success. The mother was persuaded to allow her to go to school unattended, to furnish her with certain responsibilities about the house, and above all to help the child become emancipated from her state of dependence. She returned in a week much improved, had had only one attack of diarrhœa, was feeling much better, less nervous, and had attended school each day. Four subsequent visits were made, each time with continued improvement, and gradual loss of all symptoms; she had become more self-reliant and independent to all good intents and purposes. She is now enjoying good health.

“This case illustrates very well the ease with which a child may become habituated to certain psychopathological means of adaptation, and demonstrates the necessity of obtaining a comprehensive understanding of the life of the patient in all its aspects. The lesson

to be gained from it is even more forceful, when we recall that this child had been receiving medical treatment, as such, for a period of over two years."

Now this case, which we have just reviewed, had marked physical symptoms; yet all that was the matter was faulty mental adjustments. Repression was almost immediately met by conversion. This case is by no means the rarity, but is typical of many instances in which conversion alters the appearance of physical disease or really produces the appearance of bodily ailment when nothing is really wrong.

IS THE BODILY AILMENT INTENTIONALLY FAKED?

The patient whose seemingly bodily ailments are a conversion of some repressed mental activity usually receives little sympathy. They say she does it just to gain sympathy, or she has a headache just to get out of doing the family washing. Well, maybe so, *probably* so. But the point which we must stress is that the patient with an active conversion is as little aware of the real significance as you or I are of the real basis for our likes or dislikes or of our choice of a vocation. Here we have another instance in which the surface activities and mental states are determined by activities ordinarily unseen and unknown, unless a special study has been made of them in each individual case. It is much with them as it is with the iceberg. The iceberg may be carried in a direction opposite to that of the surface currents of the ocean because two-thirds of the iceberg is below the surface and it is carried by the deeper ocean currents. Just so with these mechanisms of adjustment to conflicts and their ensuing repressions. They are carried by the deeper currents of which one is ordinarily unaware.

Bodily ailments are sometimes intentionally faked, however. When disease or ailment is thus intentionally simulated, it is called **malinger**ing. Men who wanted to be exempted from the recent army draft during the Great War imitated all sorts of bodily ailments that they might get out of serving. Picric acid was used to

produce apparent jaundice, deafness was faked intentionally, some even went so far as to have their trigger finger amputated, others wilfully contracted venereal diseases, in the hopes that they would thus be passed up by the army examiners.

It is much different, however, with the person who is meeting some repressed activities by conversion. We may draw again upon the army experiences during the Great War for innumerable instances of conversion.

It will readily be admitted that the soldier suffered a multitude of conflicts in adjusting himself to the demands of mobilization and actual combat. Friends and home folks had to be left, frequently against the soldier's own wishes; individual tendencies had to be suppressed in the period of mobilization; the actual combat and periods leading directly to combat necessitated a repression of the instinctive activities associated with self-preservation.

In large numbers of the soldiers, these repressions became converted into the wide range of bodily symptoms found in what was at first called "**shell-shock.**" Shell-shock is not really shell-shock, but is a conversion adjustment; it is a **psychoneurosis**, as all hysteria is now generally known.

Thus the psychoneurotic soldier suddenly became apparently blind, or developed a spurious paralysis, without his knowing why or what it was all about. The repressed desire to be with home folks or away from the frightful carnage of the battle field became converted into certain symptoms, which made it apparently impossible for him to continue in active service. To a certain extent we begin to see that, after all, this conversion mechanism is of some service in adjusting the individual to life. Oftentimes the psychoneurotic soldier recovered when he was removed from the active battle lines; for some, a trip to the homeland was necessary; for others, simply convincing them that their ailment was rather an accident of nature than really genuine, brought about a recovery. The patient who was hysterically deaf was placed in front of a mirror; hands were suddenly and unexpectedly clapped behind his head, and the slight jump he made was reflected to him from the mirror, convincing him that perhaps, with a little intentional effort, he could hear.

WHAT TO DO WITH THESE NATURE FAKERS

We have emphasized all through this chapter that the psychoneurotic is nature faked rather than an intentional nature faker. They are the victims of unfortunate adjustments, just as is the anti-vivisectionist. The intentional malingerer, on the other hand, is about as bad a specimen of dishonesty as one would care to find. How to distinguish these two conditions is no easy task. Distinguishing real from apparent ailment is, in itself, a task involving the highest diagnostic abilities and skills.

The suspected psychoneurotic should always be given the benefit of the doubt until the real condition is definitely determined. Grave organic disorders have been passed over superficially as "functional" or psychoneurotic much to the permanent injury of the patient. The Christian Scientists are doing this daily. On the other hand, it is a grave injustice to the patient to permit a functional conversion ailment to remain so. If Dr. Kenworthy, or another physician who understood psychoneurotic disturbances, had not got hold of the little girl mentioned earlier in this chapter, she might have grown into womanhood as a confirmed psychoneurotic. This girl had been under the care of orthodox physicians without receiving any benefit for her trouble, which was due to faulty mental adjustments. It is no task for the novice to attempt to treat the psychoneurotic symptoms. Much harm can be done by the inexperienced, untrained person in dealing with these patients. They are properly a subject for psychotherapy, which is beyond the scope of this book on applied psychology. A great deal can be done, however, in a harmless way, by the use of some minor accessories of the psychotherapist.

Many of the symptoms of the psychoneurotic can be removed by **persuasion** or by the use of **suggestion**. We have already seen how the psychoneurotic deaf person was brought back to normal by convincing him that he could hear. In the chapter on suggestion, we shall take up the rôle of this agency in dealing with the psychoneurotic, as well as in the management of the normal individual.

Removing the patient from his environment is not the best procedure; neither is altering the environment the best policy. It

is the patient that is usually at fault, not his friends and home life, although it must be borne in mind that these may not always be the best. A reëducation of the patient to his repressed tendencies to activity gets at the source of the trouble oftentimes. The "**talking cure**" is not at all bad for these patients. By this is meant letting them take one into their confidence, talking over their worries, their ambitions, their troubles. Their repressions are in this wise frequently brought back into the light of day and then lose their potency for causing upheavals in the mental life.

A case in point is an old college friend of mine, who, a few months ago, hunted me up to tell me that he was going to commit suicide. Life had become unbearable, his wife was not fair with him, everything was turning out to be a failure so far as he was concerned. We walked through the park letting him tell his troubles and complaints with life; he gushed forth volumes. I did little more than to encourage him to continue; I did not sympathize with him. My conversation for several hours was limited to "Well, well!" and "Humph!" He did the rest. As we approached the lights at the park entrance, he said that my talk to him had done him worlds of good, psychologists were wonderful, and that perhaps he would not snuff out his life as he had intended to. So there you have it! He just talked it out of his system; many of his repressions were aired off and ventilated. Just getting it off his chest was better than bromides and physic.

The nurse also should gain the confidence of her patients, and she should betray that to no one but the physician. Letting the patients tell their trials and troubles, encouraging them to talk them over, giving them no words of sympathy or judgments of value, will cleanse and renovate repressed activities which are seething and frothing away below the light of day, releasing their energy into less harmful channels. Remember that, although their painful experiences may appear ridiculous to you, these same experiences are the most real thing in the world to them. Upon these trivialities of life hang not merely likes and dislikes, but in many patients invalidism and health.

TOPICS FOR DISCUSSION

1. Might hysterical patients account for the phenomenal cures of faith healers and the hordes of drugless healers?
2. If you suspected a patient of having hysterical deafness, how would you try to detect the feignedness of the ailment?
3. Are referred pains hysterical? Why?
4. What is the essential difference between hysteria and malingering?
5. Which is the better policy, to assume that all diseases are organic until proven hysterical, or just the opposite?
6. Could hysterical affections be cured by operation?

CHAPTER XVII

USE AND ABUSE IN THOUGHT

The Power of Thought—Unhealthy Thought—Mental Honesty—The Value of Friendships—The Caterpillar and the Butterfly—Forging Higher Things—Sublimation—The Source of Happiness.

THINKING is about as powerful an influence as there is in the universe. It builds bridges, airships; cures disease, or makes for personal efficiency and happiness. On the other hand, it may build weak bridges, erect the skyscraper on the sands, cause wars between nations, or lead to mental disorders. Powerful as is the influence of thought, it is also extremely likely to become misdirected. There is use and abuse in thought, as well as in the use of muscles or the digestive apparatus.

Thought brings the body into subservience to the mental life. The mastery of the body in the acquisition of skills of coördination is facilitated, or hindered, as we have already seen, by the way in which one uses his head in forming these skills. Intelligent direction of the body while the skill is being gained, reduces the effort necessary to become proficient in that work as well as in the end increasing the proficiency.

But man lives a social existence. His life must be coördinated with the lives and activities of others, just as his muscles must be coördinated if their usefulness to the organism is to be increased. Man must make certain social adjustments through the medium of thought. The human being does not live by himself alone, he associates with others, his life and happiness is a part of theirs, their lives and welfare a part of his. The one serves as a sort of a boomerang on the other. There is no escaping it.

It is not merely an accident that mankind lives a social existence. In the chapter on "Instincts and the Patient" we found that Man has a special instinctive equipment that makes it impossible

for him to be other than a social animal. To be banished to a St. Helena or a Wieringen, to be deprived of social intercourse and friends and respect, is well nigh unbearable.

But at the same time human beings are commonly as selfish as they are social. Here we meet our old friends: conflict between desires and activities with the resulting repression of one. The last chapters have shown some ways in which this may lead to an abuse of thought. The commonness of this abuse is almost appalling. It is not leading the nation to the mental ward, but it is adding particle by particle to a vast inefficiency. How to avoid this inefficiency in the case of the skills and the emotions, we have already discussed. We will devote these few pages to pointing out the most efficient modes of adjustment to conflicting tendencies to activity.

UNHEALTHY ADJUSTMENTS

There are some modes of adjusting to conflicts which are undeniably unhealthy. Some of these consist in **satisfying the wants of the organism through mental channels**. The desires are usually material and concerned with real things, some of them are intense organic cravings, as food or love. These can never be met and satisfied through the agency of the imagination.

For example, the person who has gone without food for some time will soon perish, if he denies the existence of his hunger or of his need for food. The fundamental trend has not been satisfied. The conflict between desire and reality still persists. Much the same is true with our mental wants. The desire for the esteem and honor of our acquaintances exists, whether we deny it or not. It may be repressed and compensated by denying its existence, and doing everything one can to produce the impression that not one whit is cared for others' opinions of us. But here the behavior gives way, to the psychologically trained observer, the very thing which it is attempted to conceal.

The person who says: "It makes no difference to me whether or not I am invited to this affair" really wants to go. And he should openly recognize that he *does* want to attend the affair, but that circumstances will, perhaps, prevent him. It may be good

policy, perhaps, to give others the impression that your feelings are not wounded by not being invited. But be fair and square with yourself! Do not deny the existence of a desire to yourself. While you may never receive the invitation, do not repress the hope by denying it. If you do, the repressed bundle of energy will begin to cut strange capers, you may unwittingly form an aversion to all dancing parties, you may begin to think to yourself that after all you are much superior to those who did attend and are above their social class, or the repression may be modified through conversion into apparent illness on the night of the party, which is the same as to say, "See, I could not have gone anyway!"

Honesty may not always be the best policy in dealing with others. But mental honesty with oneself should be an inexorable rule. Frankly admit to yourself your whims and desires which may never be realized, hope that some day your ship may come in, and then all will be as you have wished it. Not merely hope and wait for this good ship of fortune to come in, work for it, if the desires are meritorious—this ship of fortune is not sailing some distant sea, but is cruising within your own mental life! Keep the hopes and desires that cannot be realized at the moment clear, do not repress them; if they are worth while retain them as the guiding posts of your life's endeavor; if they are not noble and worth the effort, put them to other uses, perhaps to some worthwhile end. At all odds keep them and the energy which they represent from becoming distorted into any but useful adjustments.

THE VALUE OF FRIENDSHIPS

Poets have long written of the beauties of friendship. The modern psychologist can outdo the poet in the beauties and value of friendship. Friends are useful not merely to tide one over a period of temporary financial stress and strain. They are one of the great agencies for tiding one over the stresses and strains of life itself. Encouragement they may give, actual assistance may also be their contribution. But, almost paradoxical it may seem, their greatest value to ourselves is through our attitudes and confidences to them.

They are of greatest value as we look upon them, rather than as they look upon us.

We mentioned the "talking cure" in the last chapter. Just getting one's repressions off one's chest, pouring out one's heart in confidence was found to relieve apparently bodily ailments. Here is to be found the great psychological value of friendship in the *use* of thought. Many a friend is one with whom secret confidences are exchanged. Life's troubles and conflicts are talked over in the confidence of friendship, thus drawing off the conflict, relieving the potential repression of its native powers for energy transformations in the mental life. A staunch friend and true is the one who listens to the confidences, does not weep on one's shoulders over the trivial experiences of life which he has magnified. Sympathy there must be; but not a maudlin exaggeration of sympathy for things which are after all usually trivialities.

With the friend one should discuss one's life's ideals and failures as objectively as the fracture case or hours of duty are talked over. Nothing should be concealed; the very thing which you would like to conceal is just what should be talked over. The confidences that come easily and spontaneously are somewhat of a camouflage; they hide the real things, which should be gotten out of the system, as it were. Select your friends with care, then force yourself to conceal not even that which you most want to. It is just these activities, of which one only wants to tell the half, that are the most potent in the formation of useless and even pernicious modes of mental adjustment. They carry the most energy for disturbing one's intimate mental life; get them deenergized in the light of day through the medium of genuine friendship.

As a child, our parents, more especially our mother, are usually the ones to whom we took our slightest trouble. Here is perhaps the first and truest friend to each of us. Select your friends and be a friend according to the characteristics of this universal friend. Mother was patient in listening to the troubles, even before enough language had been learned to tell them intelligently; a mother never betrayed these confidences; she never unduly sympathized over

life's small tragedies; and the mother who was the ideal friend never took the part of the child who was on the wrong side of the question. She realized that, at times, even "mother's angel child" might not have been the most angelic human on this earth.

FORGING HIGHER THINGS

The worm-like, fuzzy, creepy, rather repulsive caterpillar metamorphoses into the gloriously designed butterfly. The crude, crumbly ore is forged into the strong thing of iron. All Nature is characterized by this transformation of common, weak, menial things into that which is most beautiful and stable. In this the mental activities, also, run true to form. They are moulded by Nature as well as are the other things in the world about us.

The mechanisms of adjustment, which we took up in the two previous chapters, may have left the incorrect impression that conflicts, with their ensuing repression, always result in an abuse of thought. This notion must not be entertained. For the last example of a mechanism of adjustment we have retained what is called **sublimation**. It is this mechanism of adjustment that is back of all that is considered good, noble and enduring. Even the name itself contains a suggestion of the *Sublime*.

In sublimation the energy which is usually permitted to run wild when tendencies to action are repressed is **put to some use which is usually of social value**, or at least of much more value to the individual than is projection, compensation, rationalization, and the other modes of adjustment which we have given in earlier chapters. When subliminated the crasser sexual tendencies find expression in beautiful paintings, sculpture, love sonnets, and even love and devotion to an ideal. The widowed mother of Dr. Kenworthy's patient had a much greater devotion to her daughter than is usually found; here was a sublimination of the repressed sensual activities.

A properly repressed and subliminated outbreak of anger does not find its usual manifestation in breaking the furniture or becoming angry with one's best friend. It may become subliminated into

righteous indignation for a cause. It does not become projected by thinking that the other person hates one, or compensated by manifestations of intense affection.

Sublimation is of frequent occurrence. The love tendencies of the spinster are sublimated in her attention to the proverbial household pets. The childish tendencies to inflict pain are sublimated in the zealous devotion of the surgeon to his chosen calling.

The tendencies to action are not repressed in sublimation. They are simply drawn off into other and more useful channels. This is of much importance for the physician and nurse. The nervous patient, who tears at the hem of the sheet in her fidgeting, may have her actions repressed by applying mitts. But then, as is now clear, the repressed tendencies to action find outlet through some other method of adjustment. This may be antagonism to the hospital, fear of doctors, or any one of dozens of possible manifestations. The same patient could have this nervous tendency sublimated, as I have frequently seen it done, by having the same bed patient who persisted in destroying sheets fold paper napkins by the hour. To be sure not all the napkins were accurately and neatly folded, but the tendencies to action were utilized in a much more useful and healthy form than they would have been if it were attempted to repress them.

In the management of patients it should always be the aim to **sublimate, rather than to repress**, any undesirable activities. For one's personal *use* of thought it is well to select some semi-idealistic cause for which to work, thereby drawing upon repressed complexes of energy and releasing their activities through sublimation. This burning passion may be one's vocation; but one should at the same time live a well-rounded existence by identifying oneself with other social institutions, it may be a campaign for higher standards of nursing and medical education. Whatever you do, at least select some things; devote yourself to these causes for which there is no reward other than the satisfaction of the heart. It will do you good, and the chances are that you will do the cause good. Altruistic activities bring perhaps as much benefit to the small group back of them as they do to the group which it is hoped to benefit.

And as for happiness—why, that is an inner affair. It is determined more by ourselves than by others. One should not look out into the world for happiness, but rather within his own life vista. One who practises psychology is almost a full-fledged Christian Scientist, emphasizing the fact that it is ourselves, not others, that make our happiness. It is through the proper use of thought, through the more efficient modes of adjustment, that happiness is attained. This depends upon our abilities to look things squarely in the face, never shrinking from unpleasant realities, admitting that we wanted to do this but were prevented, using the imagination for the constructive work of planning cleaner cities and not indulgent day dreaming. You are your own citadel of happiness. Your rôle in the happiness of others is to see that their adjustments to life's situations are for the best.

TOPICS FOR DISCUSSION

1. In what respects is imagination useful? In what respects harmful?
2. Is compensation a use or abuse of thought?
3. How might an old maid meet her repressed love needs in
 - (a) compensation?
 - (b) projection?
 - (c) rationalization?
 - (d) sublimation?

CHAPTER XVIII

HOW TO USE SUGGESTION

Controlling Behavior the Aim—"Hospitalization"—Imitation—Hypnotism—Association of Ideas—Suggestion—Factors Helping Suggestion—What to Say and How—Suggesting the Wrong Thing.

HUMAN beings are essentially machines for reacting to their environment. A schoolmaster sits on a tack; he is promptly stimulated to react. His first reaction, after seeing the point, is to jump; his next reaction will probably be to single out the boy who is absorbed in deepest study, and apparently the picture of profound interest in his lessons.

It is the aim of an applied psychology to be able to predict what people will do under certain conditions and how to control their actions as we would like to have them. And under actions we must include thought, for this, too, is a method of reacting to the outer world as well as to the inner world of ideas. It is easy to predict what some responses will be. Stroking the bottom of the foot lightly will bring about the simple type of response known as the Babinski reflex. In a normal person, a light tap on the tendon below the knee cap brings about a jerking of the foot. Such simple bits of behavior as these can be readily and accurately predicted. Controlling them is a more precarious matter.

In our dealings with the patient and our friends, however, these simple reflex responses are not of much everyday importance. We are usually more interested in the more complicated responses of ordinary life, mundane as it may seem. We want to know how to control the behavior of others so that they will do certain things intentionally. We desire to get them to act voluntarily. The young lady may secretly want her escort to purchase tickets for a certain

entertainment. To ask him frankly to do so, however, would be a breach of etiquette and rather brazen. But rare indeed is the modern girl who cannot get the idea across painlessly and effectively. The escort has bought the tickets; nobody told him to, nobody requested it. Now there have been no malign influences at work influencing his choice of activities. It is a perfectly normal occurrence, even if we may admit that he is probably head over heels in love.

Ensnaing the opposite sex into purchasing tickets may not be quite a representative example of how the reactions of others may be brought under control or modified. The army officer commands his men and they obey instructions to the letter. The physician issues orders to a nurse; these orders are followed as written. The nurse or the physician wants to obtain or modify certain responses of the patient. Perhaps the patient refuses to submit to a needed examination or operation. There may be needless and groundless fears which need to be modified into interest and anticipation. A certain attitude on life may be needed to forestall the pernicious effects of "hospitalization." The most effective way to get others to do as we want them to or to think as we want them to is the big problem. How best to accomplish this we will take up in this chapter.

Every human being has countless thousands of learned and unlearned actions that it is possible for him to perform. The neurone patterns controlling these are lying in readiness for the time when they will be needed. All that is necessary for them to be brought into action is the proper stimulus. Practically everyone can throw a ball with more or less skill. All that is needed is to get them to do this is the proper stimulus. Ah, there is the rub! What is the proper stimulus? You might throw the ball to a person and he might respond by tossing it back to you. Or, you might hand him the ball, saying, "Throw this is far as you can." Or you might vary that procedure by saying, "Throw the ball at once, or I shall make you go without your supper." You might get the response you wanted, or you might get chased off the lot.

Any stimulus is not always sufficient to bring forth the response that is desired. Not all are equally effective. Sometimes a gesture is more effective than a spoken command. Some spoken commands are more effective than others.

IMITATION

The child learns most of its language through **imitation**; he does what he observes his elders do. If they swear, he swears; if they stutter, he learns to stutter. If they throw a ball over-hand rather than under-hand, he does likewise. The parents can thus control the behavior of their children, to some extent, by doing what they want the child to do. It is the old adage of example being better than precept. And it has good psychological justification. The depressed patient, the homesick youth, is not made happier and more comfortable by weeping on his shoulders. If the nurse opens her mouth when giving a patient medicine orally, the patient's mouth may open through imitation. Someone, who thought imitation was limited to smiling, said a smile is contagious. Frowns and bad tempers are probably just as contagious. All visible actions are contagious in the imitative activities on the part of the observer.

The application of imitative control over action is obviously limited. But it must not by any means be undervalued. Habit is little but imitating our own actions; imitation of our own actions is thus seen to be quite as important for the control of our own behavior as in the control of the responses of others. But when we are trying to encourage a patient to have some ulcerated teeth extracted, we cannot very conveniently have ours pulled, by way of example which it is hoped the patient will follow. It, therefore, becomes necessary to look for other ways and means of getting the reins of the other fellow in our hands.

One way in which this might be accomplished would be through the aid of **hypnotism**. We might hypnotize our patients. Then they would do to the letter everything we told them to. A regular hospital heaven here on earth! It would only be necessary to

tell the giggly, silly, talkative patient to be serious and, lo! it would be done. Minor operations could be performed, as, indeed, they have frequently been done, without any anæsthetic but hypnotism. Just tell the hypnotized patient that there will be no pain and he will feel none. Would it not be grand if all this could be brought about? Well, perhaps it cannot be realized in such an extremely desirable form as we have just pictured. But, there is no gain-saying the point that hypnotism gives us a clew which will lead us to a great aid if we follow it up.

HYPNOTISM

Hypnotism is probably as old as the human race, if not older. It did not receive intensive study until the nineteenth century. And then it received about the same clouded scientific treatment as did anatomy and physiology at this time. During this period, it was currently thought that the hypnotic condition was produced through the influence of some mysterious force such as "**animal magnetism.**" After much experimental work to-day we now know that the hypnotic condition is not due to any such unseen and mysterious force. It is not a condition common to a few eccentric persons, but common to all mankind, and perhaps some of the lower animals as well.

When hypnotized, the person will do everything that he is commanded, regardless of how absurd or ridiculously impossible it may seem. Here is absolute control of action for you. Tell the hypnotized person that he is a senator from Missouri, speaking in Congress, and he will mount a chair and talk about the tariff. Tell a full-grown man that he is a child of four and that the rocking chair is his mother, and he will act upon your suggestion. Or tell the hypnotized person that one week after this day she will have her hair bobbed or dyed red, and she will do it, although apparently unconscious of why she did so. Hypnotize the psychoneurotics and tell them that after they are awakened they will find their ailments gradually dwindle into insignificance and that is precisely what will happen.

The key to the understanding of hypnotism is **suggestibility**. Suggestibility is common to everyone. In the hypnotized person it is exaggerated for the time being. So here we have another master key for unlocking the secrets of the control of behavior. We cannot hypnotize our patients or our contrary friends. But we can use the suggestibility that is common to all mankind.

SUGGESTION

What is meant by suggestibility, anyhow? We hear some one say that as he passed the shop window and saw the display of clothing the thought was suggested that he needed some new clothing. Or sometimes one hears it said that black clothing suggests sorrow. In the language of psychology, these are examples of **the association of ideas**. It is not suggestion. When the lady fair casually remarks that the Green Dragon Inn has lovely sherbets, for some reason or another the escort suddenly comes to a few moments later to find himself entering the Green Dragon. Or, when the hypnotized subject is told that the chair is a radiator beside which he may warm himself, we have examples of suggestion. In suggestion some stimulus to action, either visible or thought, is accepted and acted upon without knowing why. **The stimulus is accepted uncritically; the action is carried out fairly automatically** and without knowing quite why it is being done. Almost all inner opposition is overcome and the stimulus to act is carried out in a reflex-like manner. This is suggestion.

Suggestion is capable of taking control of the actions of people in their usual conditions, as well as when in the hypnotic state. Certain tricks, however, facilitate and increase the degrees of suggestibility. These are very important. We will accordingly take them up in some little detail.

First of all we may take up one of the first things to be used in producing successful suggestibility in normal individuals in their usual waking condition. This is **monotony**. Better results in suggesting actions and forms of response in general can be obtained off the wards. The loud ticking of a clock in regular rhythm, the ominous silence. These contribute to the state of mind that makes

for most effective suggestion. The public speaker uses this by long pauses, just before he utters the sentence which he wants to produce action. The physician and nurse can also use these pauses that make seconds seem like minutes. It is not how much is said that leads to most effective action through suggestion. It is what is said that counts. Saying too much may spoil the effect. Pauses not only heighten the receptiveness for suggestions to action but at the same time, they give one time to think what the next step should be. The pause gives one an opportunity to use one's head according to the general principles which we are giving.

Closely pressing monotony for first place is the **limiting of movements**. This is one factor that adds to the suggestibility of the crowd or the mob. Large groups of human beings are much more suggestible than any of the individual members of the group would be away from the group. The fact that in the crowd the voluntary movements are limited, due to the jamming and crowding, aids in this increased suggestibility. The most advantageous time for suggesting what is wanted is while the patient is lying perfectly quiet. The *débutante* waits until Dad is comfortably relaxed before she broaches the subject of a new gown; she does not mention the subject while they are on the golf course. The physician and nurse can do likewise; see that the patient, through some pretense or other, is relaxed and motionless. Anyway, the rest will be good for them—and it is an advance in strategy.

WHAT TO SAY AND HOW

Now that the stage is all set for the highest degree of normal suggestibility, what are you going to say and how are you going to say it? That looms now as the big question. In many instances this is *the* question. Lack of time and favorable circumstances may make it impossible for the patient's movements to be minimized and monotony produced through a faked reading of the pulse, as the suggestions are being deliberately given the patient. In many instances, it is through the medium of language alone that suggestion is accomplished.

A hypnotized person can be told to do a thing directly, as a command. But obviously that cannot be done with persons in the normal waking state. To command them directly to go to the operating room is likely to bring out all the opposition there is. To tell



Courtesy American Red Cross

FIG. 44.—An artistic example of unspoken suggestion. Lakeside Publishing Co., New York.

the patient directly to stop his brooding, will more likely intensify it. In normal suggestibility, the great results are obtained when the actions or thoughts are brought up **indirectly**. When responses desired are suggested in a rather unostentatious way, as if they had almost been thought of by the subject himself, then they are more likely to be acted upon.

Flattery is a good way in which to produce the effect of the response suggested having originated within the head of the patient. 'You have *good* judgment, you are intelligent, and, of course, you want to have the window open" will forestall any objections. The contrary-minded person is taken off his feet through the use of *indirect suggestions* such as these. The spoken formula, which oftentimes brings almost magical results, can of course be varied. But it must be kept indirect if results are to be obtained. "You are getting stronger now, your cheeks are rosier each day. You will probably be walking in a day or so." "My, but you are looking better! Aren't you? (And rushing on before they can reply.) I know you want more on your tray to-night."

There are certain little tricks to giving successful suggestions, besides *always* using indirect suggestions. During a stay in the patient's room, while the morning's work is being done, the actions that are desired can be mentioned, indirectly of course, several times. There is a cumulative value attached to this **repetition** of indirect suggestions. Do not repeat them several times, one right after another. Space them. Tell a story to distract the patient's attention between suggestions. Then back to the responses that are being cultivated in the patient. And always leave, as a parting shot, an indirect suggestion. The **last impression** has great suggestive value in producing desired responses. You will notice that, in the above paragraph, the response was brought in at the last of the little speech for the patient. It should always be so.

SUGGESTING THE WRONG THING

Precautions must be noted. It is the easiest thing in the world to think one is giving an indirect suggestion when it is really a suggestion in the opposite response. Saying, "You are not going to be afraid" really suggests being afraid. "Do not think sad thoughts" suggests that they be thought. "Eventually, why not now" has been a rather expensive advertising slogan, for it suggests to the prospective purchaser that he keep putting it off a little longer. It should always be the aim to present the suggestion *indirectly*, and to have it as *unequivocal* as possible. That is where **negative phrases should be avoided**. Make the suggestion appear

spontaneous, indirect; but, at the same time, avoid all possibility of having suggested the opposite response.

Regardless of one's best efforts to avoid giving a suggestion of the actions that are not desired, it sometimes happens that there are people who do just the opposite. Small boys are noted for doing just the contrary of what they are told to do. Some people who are full grown have the same reputation. These people are called **contra-suggestible**. They always do the exact opposite of what is wanted, they never agree with one, are always ready to argue the opposite. In its extreme forms, contra-suggestion is found in the negativism of patients with some forms of mental disorder. If a catatonic patient is told to stand up, he sits down; if he is told to be quiet, he talks; if he is told to eat, he promptly stops eating. These are the rare cases, however. For every person who is strongly contra-suggestible, there are a hundred who are readily suggestible. These hundred may be moved to plain stubbornness if suggestion is not correctly used. But, by following the principles which we have laid down for successful suggestion, the actions of others can be brought more securely under our control.



FIG. 45.—An example of contra-suggestion in its extreme form. This catatonic patient was directed to put his hands in his pockets, look straight ahead, and keep his chair on the floor. The above picture shows what he did. Courtesy Lakeside Publishing Co., New York.

There is no royal road to success in this. It means simply the conscientious and persistent application of the teachings of applied

psychology. It will take practice, lots of it perhaps. Careful thinking will be necessary until the art has been firmly acquired. But the results to be gained are worth the small effort required.

In many sick-rooms, the patient is more important than the disease. Bad habit formations may appear which are more serious than the formation of scar tissue. These habits need to be modified, different responses of thought must be cultivated, the patient's coöperation must be secured. Much of the behavior of human beings is due to deeper currents of mental life than they are ordinarily aware of. They unwittingly succumb to mechanisms of adjustment such as projection, and rationalization and introversion. Rare indeed is the person who really knows his own mind. The patient, or our friends, or we ourselves, must not be discredited for any peculiarities or bad features of the mental life. All of us are somewhat its innocent victims.

It is possible to alter even the most persistent reaction. Man's inherited instinctive activities and his common suggestibility furnish the most ready means for a quick control of his actions by others. Complete honesty with ourselves about our motives and desires will keep our mental life better balanced. Human behavior is too important a thing to be bungled with through life. Study it, control it for the best, make the most of it. You enjoy happiness, you enjoy the happiness and health of others. You enjoy associating with human beings. It is the behavior of human beings that plays the most important part in our daily activities. Use it for the best, modify it for the better. Both yours and the other fellow's.

TOPICS FOR DISCUSSION

1. Which of the following are imitation, association of ideas, and suggestion:

- (a) hearing "ham and" and thinking breakfast?
- (b) tidying one's hair when another nurse does the same?
- (c) opening the window after someone has said, "My, it is warm in here"?

2. Make a list of the tricks that facilitate normal suggestibility.

3. Recall some instance when a patient refused to do as you wanted or perhaps did the opposite. Had you suggested the opposite inadvertently?

4. What is the handicap in using suggestion in a nervous, fidgety patient?

PART IV
MENTAL HEALTH

CHAPTER XIX

THE NURSE AND THE MENTAL HEALTH OF THE NATION

The Age of Brains—Imaginary Ailments—The Magnitude of Problems in Mental Ill-health—"Insanity" Only a Part of the Field of Mental Ill-health—The Nurse and Mental Ill-health—Historical Attitudes Towards Mental Ill-health—Our Modern Heritage.

THE strength and progress of a people does not depend so much upon wealth and physical prowess as it does upon the mental abilities and the degree of intelligence of the citizens. Especially in a democracy the mental health of every individual is a contribution to the strength, or the weakness, of the Nation. The age in which we are living is one in which "brains" count for a great deal. Even on the football field, it is not the heaviest or the fastest player that controls the plays of the team, due to his weight or fleetness. Quite often it is the little player, with his thoughts more nimble than his heels, that guides the plays and strategies of the team. The destinies of a democracy are not dependent alone upon the mental health and nobleness of a few leaders—the mental health of every citizen is bound up with the welfare of the nation, and this welfare in turn is dependent upon the mental health of the great majority of the citizens and not alone upon a few outstanding leaders.

We, the American people, are probably as inefficient a people as one will find anywhere. True enough, our levels of efficiency have been raised by the application of electrical, chemical, and mechanical science to our daily living. But behind all this apparently wonderful progress is a seething mass of mental ill-health, not actual mental disease, perhaps, but very definitely unhealthy mental adjustments to life. It is doubtful if our mental efficiency has kept abreast of the increases in the economical use of the so-called material sciences.

Many of the misconstrued "imaginary" ailments of the clients in the physician's waiting room are an evidence of mental maladaptation to life. The worker who is all the time quarrelling or not getting a square deal is another suspicious character. The person who gives up and whimpers when difficulty looms ahead will also stand watching. These minor, but still very important, deviations from genuine mental health contribute to a vast mental inefficiency.

The more severe cases of a lack of mental health are in themselves a great national problem. Can you imagine a district three times as large as the District of Columbia, with a population greater than that of the State of Delaware, set aside in the United States to accommodate all the individuals with actual mental disorder? Almost inconceivable! Yet that is exactly what would be required if all the hospitals for patients with mental disorders in the United States were brought together.

Figures and statistics are usually pretty dry affairs. But these deal with life and its tragedies. Twelve times as many institutions to care for mental patients as there are universities in the Association of American Universities seems rather out of balance. Every year about 60,000 people leave home and friends and are given to the care of the state because of mental disorder.

THE MAGNITUDE OF PROBLEMS IN MENTAL ILL-HEALTH

There are about 233,000 mental patients now *under care* in the United States. This in itself constitutes a great drain upon our national efficiency. It costs over sixty million dollars each year to care for these people. Then, in addition to this actual expenditure is a loss through the mentally ill not being able to engage in any productive work. In New York State alone this loss to the state, through *one* group of mental diseases in *one* year, was *five million dollars*. When one pauses to consider all the states and all the forms of mental disorder, this loss is appalling.



FIG. 46.— Interior and exterior views of patient's Cottage of a modern mental hospital. Courtesy Lakeside Publishing Co., New York.

The census reports show that there are only about 233,000 mental patients in special hospitals for their care and treatment. This is probably the most accurate census of the kind ever taken, but in spite of this fact, there are many more people with definite mental mal-adaptations. Some of these are not severe enough for the afflicted or their friends to realize that care and special attention is needed. A very large number of these are in almshouses, some in penitentiaries, some tramping, some right in our own neighborhood. The woman who is morbidly afraid of cats, the man who is always leaving a job because his bosses are not fair to him, the intensely jealous wife, the political and religious fanatic are not included in the census reports of mental patients—yet. But they are all suffering, not from actual persecutions and political oppression, but from the working of perverse mental adjustments.

This loss and drain upon our national efficiency is not for just one year, but continues year after year without any remission. As a matter of fact, there has been a steady increase in this cost due to an increasingly large proportion of persons receiving such care and treatment. This does not mean, however, that mental disorders are increasing year by year. It simply means that better facilities are being provided for their care, and that more people are coming to realize the necessity of early attention to their disorder if a recovery is to be expected.

One of the most pressing of our national problems is to check the occurrence of these actual mental breakdowns and near breakdowns. It is possible to do this. The nurse has a personal interest in seeing that her mental life is kept at a healthy level. She has a professional duty in doing all that is within her abilities to know how to meet certain problems in mental ill-health. The nurse may exercise only a transitory influence in the lives of her patients, but she enters their lives at a strategic time, and can accomplish much in bringing about a better mental adaptation to life as it is, and probably always will be. In the earlier chapters on "How Behavior Indicates Mental Activities" and "Use and Abuse in Thought" we took up some types of mental adaptation that may become undesirable. In this part of the book we will take up some problems in

the antithesis of mental health. The modern point of view is that in cases of actual mental breakdown we are not dealing with anything new, but merely an increase or exaggeration of certain wholly normal types of adaptation that are common to all.

“INSANITY” ONLY A PART OF THE FIELD OF MENTAL ILL-HEALTH

Problems in mental health to most people seem to centre around the “insane.” This is because very few persons have a proper scientific and practical conception of mental ill-health. For some reason or another mental ill-health, or poor mental adaptations, seems to be identical with “insanity.” Such is not the case. Innumerable instances of poor mental health appear for each case of actual *legal* “Insanity.”

As a matter of fact, the term “insane” is not a psychological or a scientific term at all. It is a legal term. And, as a term used primarily by lawyers and law-makers, it is descriptive of social conduct rather than of any mental condition that is unhealthy and lessens mental efficiency. A person is “insane,” only when his conduct is such that a jury in the courtroom judges it best for the welfare of the community that a guardian be appointed, and the conduct of the person kept under restraint. These untrained jurymen, and women perhaps, are supposed to divine whether or not the undesirable conduct results from mental causes and troubles.

“Insanity” is a legal condition and not a psychological condition. There is just one kind of “insanity” in the eyes of the law. A person is either responsible for his acts or he is not responsible through mental causes. In psychopathology, however, it is definitely established that there are at least thirty forms of mental ill-health.

It used to be thought that the states, as expressed in their laws, were interested in looking after only those of its citizens whose conduct was assumed to be a menace to the community, due to an abnormally functioning mental life. This resulted in hundreds of thousands of cases of actual mental ill-health being neglected and left untreated, just because their conduct was not sufficiently dif-

ferent and peculiar from that of other people to cause any severe apprehension.

This has been a very bad and deplorable policy. In the first place, most people have come to take this same view of mental ill-health. This has carried with it the popular opinion that the mentally ill were extremely bizarre personages, totally unlike the rest of us. Of course you are aware of the falsity of such a view.

Then, in addition to this, it has cost the state enormous sums of money through their failure to recognize that there are many people in a condition of poor mental health who are not actually "insane." These the states have neglected, until their condition has become so advanced that little hope can be held for their recovery. Mental disorder is not necessarily hopeless; but it has usually been so when the states took care of these charges.

A large proportion of cases of mental ill-health can be relieved if they are brought under skilled psychological treatment before they have become too far advanced in their pernicious mental adaptations. Until just recently, however, the states have neglected this point entirely. They have simply waited until it was almost too late for anything to be done but provide food, shelter, and protection. But now some of the states are maintaining free public clinics where those with mild mental disorders may go for diagnosis, advice, and prophylactic measures. At these clinics, they take care of the crank, the faultfinder, the nervous housewife, the child at odds with other school children, and the child who does not play for fear of being hurt. Such people, and innumerable others, are already on the road to mental ill-health. They need to be guided back to more normal and desirable mental reactions.

THE NURSE AND MENTAL ILL-HEALTH

The nurse has a very important rôle to play in raising the level of the mental efficiency of the nation. Just common sense alone is not enough preparation for this. She must, preferably, have had experience with actual mental cases in enough variety to make her familiar with the manifestations of bad mental adjustments as they

approach the abnormal. Not after they have become abnormal, but *before*. The psychology of certain types of poor mental adjustments we have already taken up in part three of this book. The nurse should have this material at her finger tips; she should watch herself with this in mind; she should study her patients from this point of view.

It is easy for anyone to pick out a person who is completely gone mentally. But it is rather hopeless by that time. People do not become mentally disordered over night. There has been a gradual development and certain causes. It is well to guard against the causes and ward off the development.

Our neighbor woman of last summer is a good example. When we knew her she was definitely psychopathic; she was intensely jealous of a decidedly ugly and ungainly husband; she was always raising the deuce with the newspaper reporters; she had the vague, changeable aches and pains of the psychoneurotic. She got into rumpuses with her neighbors because she said they were talking about her. And still, her relatives thought it was very sudden and unexpected when, a few nights past, she attempted to carve her husband up with a pair of shears. And it is due to the negligence of friends and relatives when a woman roasts her children in the gas oven. The roots of this disordered act were present long before it was carried out. She has been sinned against in not having been brought under attention before her mental life was so far distorted that she would do such an act.

HISTORICAL ATTITUDES TOWARDS MENTAL ILL-HEALTH

Among nurses, as well as among physicians, mental disorders are insufficiently understood. The actual, fairly complete, breakdown is the cause of fear and trembling; the mild disturbances of daily life are not ordinarily seen as any relative of the more grave mental ailments. The attitude of various centuries toward mental ill-health is very interesting, and oftentimes pitiable. These attitudes are also very instructive for our present purpose.

The ancients thought of the mentally diseased as being selected by the gods for special punishment. The people did the most they could to help the gods out in this. They tortured, ridiculed, stoned, and persecuted those in mental ill-health. Various nations vied with each other in selecting different methods of punishment.

Human nature is as changeable and as fickle as the weather. The ancients had considered those in mental ill-health as being selected by the gods for special punishment. But the mediæval people looked upon the mentally disordered as being especially favored of God. Their senseless babblings were looked upon as revelations from the skies. Many, who would have been persecuted by the ancients, now became the jesters of the courts, the sooth-sayers, and mingled with all classes.

Passing on through time, down to the period of the Renaissance, we find another change in the attitude towards those mentally afflicted. With the advent of witchcraft, the lot of the psychopathological again became most inhuman. All conceivable forms of torture were resorted to in the attempt to dispossess the evil spirit supposed to be the cause of the abnormality. Queer legends came to be associated with mental ill-health. This has been the heritage of popular opinion of the present generation. Scientists studying mental ill-health, however, have long ago departed from any such crude beliefs. But the opinions of the populace in general still hark back to these antiquated times.

OUR MODERN HERITAGE

At the present day, the discussion of mental disorder is tabooed by polite society. Serious reference to mental abnormality is only for gossips and scientists. It is avoided as tenderly as any family skeleton. There are several factors at work in forming these unwarranted attitudes.

The causation of all mental states is probably looked upon as being almost supernatural. Mental disorders, as well as more common mental states on the surface are somewhat uncanny and mysterious. They are objects of wonder. But still, they are

entirely understandable, as previous parts of this book have shown. Mental states operate in certain rather definite ways, and have a definite biological basis. Abnormal and undesirable mental states are not due to witchcraft, demons, or anything intrinsically mysterious. In the chapter which follows we will attempt to give the nurse an understanding of the close relation between the mental life in health and ill-health. The nurse is eager to protect her own mental life against any breakdown, however mild it may be. She also must do her duty by her patients and friends, not merely in seeing that no frank mental disorder develops, but also in keeping their mental workings at the highest level of efficiency and health.

TOPICS FOR DISCUSSION

1. What do you think of the "insanity" plea in criminal cases?
2. Write a list of words that are generally synonymous with mental disorder. Which have the best affective-tone?
3. Would you include hysteria under mental disorder?

CHAPTER XX

THE NATURE OF MENTAL ILL-HEALTH

The Biological Point of View—Human Behavior—The Normal Basis for Abnormality—An Example of Extreme Mental Ill-health—The Varieties of Mental Ill-health—Is Everyone on the Possible Verge of Mental Ill-health?

The biological point of view has been found valuable in connection with many aspects of present day science. In pathology, for example, the reactions of vomiting, fever, and chill are no longer considered as strictly pathological phenomena. They have a biological value in protecting the animal from certain harmful influences in its immediate environment. They may be unpleasant experiences, true enough, but they are, none the less, intended by nature to be of benefit to the organism. They are the automatic bodily defence set up by the cells of the organism to protect themselves from injury by certain of their enemies, such as germs and poisons. When these responses are continued for a long time, however, they become harmful in themselves; then they become strictly pathological.

The normal body temperature, for example, has been found to be most favorable for the growth of the malarial organism. A temperature of 102 degrees is fatal to this same organism. This is the approximate temperature in the malarial fevers. In the case of malarial fevers, therefore, the rise in body temperature may be looked upon as an adaptation on the part of the body to free itself of the invading organisms. The malarial chills serve the same purpose. An anæmia of the external parts of the body results from the intermittent muscular contractions experienced in the chill, and consequently, less heat is lost through radiation at the body surface. The so-called pathological symptoms of the malarial fevers are really the protective reactions of the host.

The ring of lymphatic tissues at the back of the oral cavity offers another instance of an apparently pathological phenomena,

which is in reality nothing more than an accentuation of normal functions. This ring of glandular tissue composed of the cæcal foramina, which is the deserted duct of the now ductless thyroid, the two tonsils, and the two adenoids, stands guard over the entry of bacteria into the digestive tube. In eliminating bacteria, however, these lymphatic tissues may from time to time become overtaxed and infected themselves, which results may indicate their extirpation.

HUMAN BEHAVIOR

Much the same relation is found when human behavior is viewed biologically. **All genuine mental disorders, for example, have their origin in the action of certain ways of adjusting the organism to the environment.** There is nothing mysterious or intrinsically pathological about these modes of adjustment. All normal behavior uses exactly the same mechanisms. The significant fact is that faulty or increased action of some of these types of adjustments may result in what are known as psychopathic symptoms. These may be nothing more than a morbid fear, or the inability to concentrate the mind for any length of time, or constant headaches, or the twitching of certain groups of muscles. More severe symptoms, which amount to what has been termed a mental disorder, may grow out of these.

Very few people realize the wide range of symptoms which can be produced by these mental mechanisms, but these just enumerated may serve to indicate their wide variety. The symptoms may be apparently mental, as in the case of morbid fears, or they may be apparently physical, as in the twitching of muscles. Regardless of whether they are physical or mental, if these can really be separated, it is at once apparent that they are very important, when one remembers that the mechanisms back of them are those which everyone uses time and time again each day.

These symptoms of the mental patient are not produced by any strange and unknown action of the mind. Every normal organism reacts many times daily with the same adjustments which may produce these abnormal signs which we have just been considering.

The person without some bodily or mental characteristics caused by the attempt to adjust to certain features of the environment is indeed a rarity. **The main difference between normal and pathological behavior** is that, ordinarily, these reactions are not marked enough and persistent enough to be considered abnormal or **psychopathological**.

In earlier chapters we have taken up some of the ways in which different adjustments have developed. These sometimes may become dangerous in themselves. We will take up some of these in this chapter. It is well to bear in mind continually that we are dealing with effects similar to those observed in physical pathology. Just as the vomiting is for the protection of the organism from certain undesirable foods, so these behavior mechanisms are ordinarily for the benefit of the organism. But, under certain conditions, they may become harmful in themselves.

The adaptation to the conflicts of life by withdrawing within oneself and living out a life of mental fancy is characteristic of schizophrenia, or *dementia præcox* as it is sometimes known. In this disorder, the characteristic of the mental life is a flight from reality. Imagine a life of day-dreaming, living within one's own fancies and you have a fair picture of schizophrenia. When day-dreaming comes to be the dominant type of mental reaction, it renders one incapable of getting along normally in the world. The mental reactions are not balanced. But still, it is nothing new and strange. We all enjoy day-dreaming, but do not let it come to predominate in our behavior.

The delusions of the person who imagines his closest friend is his arch enemy are not without a parallel from our normal mental responses. Under the influence of certain rebuffs, all people are likely to let such a notion flash through their head. Not until such a belief is persistently cultivated and rationalized does one have a reaction that may be called unhealthy.

The psychoneurotic may become asylum patients; we are all psychoneurotic to a certain extent, if not when facing an onerous task, we are psychoneurotic in our dreams. Here again, as in all so-called mental diseases we find that ill-health is largely founded

upon the usual type of responses. Health is just a step ahead of ill-health.

AN EXAMPLE OF EXTREME MENTAL ILL-HEALTH

Dr. Milton B. Harrington reports the case of a young man who became very disordered, seemingly suddenly. He began to talk incoherently, had violent outbursts, and was moody and depressed. It soon became necessary to turn him over to the care of a state hospital.

Here is the case of a person who had been above the average in intelligence, had been a good student, developing into severe mental ill-health. And what was the cause of it? Dr. Harrington found that the patient had always been ambitious; he had a good opinion of his own abilities and wanted to become a writer. But the young man was also vacillating and self-indulgent. Every time he came up against an unpleasant situation, he did not try to master it, but gave up in discouragement and looked for something else. His own self-comfort was guarded, even at the sacrifice of his ambitions. He left high school, because certain courses in which he was not interested had to be taken.

After he left high school he went to work, but was always leaving his jobs because his self-comfort was interfered with. He left a job in a public library, because he had to work after hours to be ready for the coming day; he was promoted later in the office in which he was working, but asked to be demoted, because his self-comfort was sacrificed with the added work and responsibility.

Was this patient born with a strong self-indulgent "streak"? Dr. Harrington made a close study of the case and concluded that it was not inborn but acquired. The patient was the youngest child; his parents and brothers and sisters petted him very much. They always fought his battles for him. He did not take his work seriously; he wanted to be a writer, and not a library or office clerk. His high ambitions served as a handicap on top of his early training in self-indulgence in the home.

This is the background upon which his mental disorder developed. A few weeks preceding the outbreak of his more severe

behavior disturbances, he had been assigned to work which necessitated making out long and detailed reports. He was too self-conscious to ask others for aid in this; he was too self-indulgent to work it out for himself. So he let it go, just killing time while on the job. The natural outcome was that he got hopelessly behind in his work. Then he quit, telling his employers that he was leaving town. He did not leave town, however. Instead he lounged around his parents' home. The rapid accumulation of back work had placed him in an anxious, worried frame of thought. This persisted after he left the work. In this depressed condition, he began to brood over his fallen ambitions. Then he went from one worry to another. He remained close to home, cried, threatened to commit suicide, and acted much as he had as an infant, when he wanted his whims and desires gratified. He magnified his troubles in an appeal to his relatives' sympathy; this same magnification justified him in not working. So long as he was seemingly unable to work, he could indulge himself to the limit. But things were precipitated rapidly. He went from worry to worry, from bad to worse, and the final recourse was commitment to a state hospital.

Mental ill-health, in extreme cases such as this, is largely an exaggeration of certain normal psychological reactions. All of us become depressed slightly from time to time, everyone gives up in the face of certain obstacles. The mental imbalance results, in the main, from the reactions of human beings to the situations in which they find themselves. This is what accounts for the infinite variety of manifestations of mental ill-health. No two persons, even twins, pass through the same situations in life. Each one hits life at a slightly different angle. Their mental life, and ill-health, consequently, never follow the same identical routes.

THE VARIETIES OF MENTAL ILL-HEALTH

It should be apparent by now that there is not just one form of mental ill-health. **There are at least thirty distinct types of mental ill-health**, possibly more. When mental disorders were first brought under scientific study they were classed as mania, melancholia, and dementia. It was simply noted whether the newly

arrived patient was excited (mania), sad and depressed (melancholia), or demented.

It was not long, however, before it was observed that patients who were melancholic when they were first examined became decidedly maniacal in a few weeks. Some time later they became melancholic once more. **The course of a mental disorder is, therefore, not always the same from day to day, or even from year to year.**

Snap diagnoses cannot be made of mental ill-health. They can not be determined after a few minutes' examination, as can a broken arm or a decayed tooth. There may be something lurking in the offing which cannot be observed from the patient's behavior. It is necessary to have the patient under observation for several days or weeks, that any changes in symptoms may be noticed. All his mental symptoms must be noted. It must be ascertained if he "sees things" or "hears things," or if he thinks people are persecuting him and trying to get possession of his property. Disturbances in emotional tone must be watched for. If he is too happy or exalted it may mean one thing, or the patient may be very sad, or just lacking in all emotional manifestations. These are all deviations from the healthy forms of behavior and must be observed.

Before a final diagnosis can be made, it is essential that a thorough **physical and neurological examination** be made. There may be some definite breakdown in his nerve tracts. If he cannot control and guide his muscles in simple actions, his mental condition may be caused or complicated by some destruction of nervous tissue.

It is always well to tread slowly in diagnosing actual mental breakdowns. But the minor variations of daily life should be checked early in their existence. The seclusive person, the one who likes to be alone and away from others, needs to be drawn out of his shell and into contact with life and people. His living in a world of mental fancy must be check-mated. A lack of interest is unhealthy. Emotional indifference, apathy, is a prominent symptom in schizophrenia. It must be warded off through interests in the events of the workaday world.

An overly intense emotional life is also unhealthy. Persons who crave sympathy should not be given it. Understanding is all right, but not maudlin sympathy. They do not get it in the world and their friends should help them adjust to the real world and not the world of heart-rending sympathies which they would like to live in.

Then there is the person who can never decide what to do. He almost decides to do one thing, then he thinks perhaps he might do something else. And so he procrastinates, never getting into action. The person who is exactly the opposite is also not in the best mental status. This is the trigger-brained person. No thought is given preceding any action. All the thinking is done afterwards—in the form of rationalizations.

It is scarcely an exaggeration to say that everyone is on the possible verge of mental ill-health. Mental ill-health is made, not born. And it can be warded off by preventing a loss of balance between the instinctive and organic needs of the individual, and the way in which these have to be met in this present world.

Some people go through life with their mental engines hitting on all cylinders; others have all their cylinders backfiring and full of carbon—these end in the state hospital. But there is scarcely a person who does not have one mental cylinder scored, backfiring, missing, or completely out of order. This may be indicated by moodiness, vague aches and pains, forgetfulness, fears, stubbornness, feeling fatigued without any organic cause, seeking sympathy, blaming others, and so on through an innumerable array of bad mental adaptations to life with its pains as well as its joys.

TOPICS FOR DISCUSSION

1. Do people "suddenly" go "insane" or is the apparent suddenness a disguise for ignorance of the early signs of mental disorder? Take examples from your own acquaintance for discussion.

2. Discuss some of the freakish notions you have heard people express about mental disorder. Are they afraid of disordered people? Have you ever heard that taking in washings drove her to the asylum? These are some suggestions only.

3. Do folks go "off" on one subject only while they are perfectly sane in all others?

CHAPTER XXI

THE CAUSES OF MENTAL ILL-HEALTH

The Moon and the Devil Blamed—Modern Superficial Studies—
Physiological Causes—Shell Shock—Schizophrenia—Paresis—
Practical Applications.

THE causes of mental ill-health have long been a topic for interesting speculation. But it is more than merely an interesting topic. It is a very vital question. It is worth while to know what these causative influences are, for by avoiding them one also would avoid mental inefficiency and ill-health.

The speculations on this topic, especially the more ancient ones, are very amusing indeed. The term "lunatic," for instance, brings down to us the remnants of the belief that mental ill-health was caused by the influence of the moon, much after the fashion of the tides. "To be possessed of the devil" is another phrase, which has brought down through the generations of its usage a vestige of the belief in which it originated, namely, that mental ill-health is caused by devils and demons.

More recently, it was the custom to go over the past history of mental patients and pick out certain events which, on the surface, seemed, more than any others, to be the cause of the mental condition. Thus it came to be that disappointment in love, loss of money, overwork, deaths, and other such events were thought to be the cause of the mental breakdown.

This was only a superficial study, however. With the modern scientific developments in the study of behavior, we know that such episodes as these are just events in a series. The disappointment in love, for instance, is not so much a cause of mental ill-health as it is a symptom. Moreover, it is impossible to determine from a superficial study just what were the most influential factors in a given instance of mental ill-health. The really significant events are

clouded over, just as in the case of the woman who took an intense dislike to blonde men. Here, again, we have the iceberg-like working of the mental life of human beings. The really important factors are brewing away in our mental basement, as it were.

In some cases, mental ill-health seems to be caused by only mental activities, in other cases, there seem to be only physiological causes, in still others it seems as if there is a combination of both of these factors.

PHYSIOLOGICAL CAUSES OF MENTAL ILL-HEALTH

For example, the mental delirium following upon a severe fever is due to physiological changes effected by the organic disease. Excessive use of alcohol may also cause disturbances in behavior that are marked enough to be considered mental disorders. But, even in these cases, no two people see the same things in **delirium tremens**. What the patient "sees," thinks, does, is largely a result of his past mental experiences. But, ordinarily, these would never have cropped out in such a severe disorder. The influence of the physiological changes was necessary in order to start the processes going.

The mental changes that usually occur in extreme **old age** are also due to changes in the nervous tissues. In old age, the chemical processes of life are slowed up and somewhat changed. The mental activities, also, are apparently slowed up in a somewhat parallel fashion.

There are many cases of mental disease, however, in which it has been impossible to find any physiological basis for the disorder. In almost all of these, it is possible to ascertain a series of mental events and adaptations that are responsible for the disturbance in behavior.

The cases of so-called "**shell shock**" among the soldiers in the World War are an instance in point. Here are splendid examples of conditions of mental ill-health which are due entirely to mental causes. We have already reviewed these cases. We have found how the soldier went through unsolicited

and undesired experiences. He was torn away from friends and family. At the front he went through many terrifying and almost unbearable scenes. It was but natural, at times, for him to wish he could be away from all this carnage of war. So his mental life played a trick on him, as it were. Sometimes gradually, sometimes suddenly, he forgot the past events of his mobilization and training. He forgot his own identity, at times, and developed a series of symptoms that made it impossible for him to continue as a front line soldier. Apparent paralyses developed, or he became apparently blind or deaf. Now, it must be remembered that the "shell shocked" soldier was entirely unaware of why these mental changes occurred. His mental life was dominating his behavior, for reasons which he himself did not know.

A LITTLE MORE ABOUT "SHELL SHOCK"

There is nothing strange and new about "shell shock." In the first place, it is really not due to shells or explosives at all. These are merely incidents, something like disappointment in love. These soldiers were what is called psychoneurotic in civilian life. And there are psychoneurotics aplenty among us. Various estimates ranging from seventy-five to ninety per cent. have been placed upon the proportion of psychoneurotics on the call list of the physician. A large proportion of all cases of mental ill-health are traceable to the action of mental mechanisms roughly similar to that at work in the "shell shocked" soldier.

We have said that there are some instances of mental ill-health in which both physiological and psychological factors are at work in bringing about the decrease in mental efficiency. The most prevalent form of mental disorder found among mental patients is an instance in point. This is schizophrenia or *dementia præcox* as it used to be known. This disturbance in behavior usually becomes rather marked in individuals about twenty-five years of age. Schizophrenia, however, has usually been in existence in an individual for a considerable time before his conduct becomes severely disorganized. Early in its development this is probably due largely

to mental causes. Unless early treatment of the proper sort is received, this disturbance of mental health becomes gradually more severe until demonstrable nerve changes are found.

Dementia paralytica, or paresis, is caused as a hangover from syphilitic infections. Here, the peculiarly characteristic mental symptoms are precipitated by definite physiological causes. All patients with paresis have the same general symptomology, and apparently due only to physiological causes. Of course, there are minor differences. The cigar maker becomes exalted about making cigars as big as a tree, and the painter becomes exalted about painting a June sunbeam.

Almost needless to say that when those in mental ill-health were thought to be possessed by devils, the treatment they received was aimed to drive the devils from their bodies. Nowadays, the treatment also depends upon the cause. But the causes are experimentally determined and not preconceived. The delirious patient must have the poisons which are acting upon his nervous system eliminated from his body. The alcoholic must also have his body freed from all toxic substances.

The "shell shocked" patient is sound organically. He needs to be readjusted, reeducated to life as it is and as others are living it. The mental irritations and bad attitudes must be altered, the proper outlook upon life must be instilled, the internal balance between the needs of Man and the realization of these needs must be restored. Fear and the other emotions have a proper place in mental activities, but they must not be allowed to predominate for a long time. They must be balanced with other mental adaptations.

Can we not make some applications from this short survey to our daily regimen. All physical influences which might have a deleterious effect upon our nervous systems should be avoided. Mental experiences such as anxiety, fault-finding, placing the blame on the other fellow, not being frank with oneself in one's own inner confidences—these must be balanced with more normal and healthy reactions and not allowed to take control.

Look within your own behavior. Are you keeping your own mental life evenly proportioned? Are you encouraging others to?

Are you being perfectly frank with yourself in all your thoughts and whims and moods?

Take stock of your own weaknesses and strengths. Do not emphasize the one over the other. When you are tempted to find fault with someone else, take stock again and see if it is really not your own self that is at fault. When you become angry, ask yourself if it is really someone else and not your own inner desires and whims that are to blame.

A healthy physical life plus a healthy outlook upon life, yourself, and others will do much to keep you on the road to mental health and happiness.

TOPICS FOR DISCUSSION

1. Describe various patients you have seen in delirium. Why did they not all see and imagine the same things?
2. Recall what we have had in Part III on mental mechanisms. How would these account for what people experience in a delirium?
3. A blow on the head may cause a lapse of memory. It may also be caused spontaneously, as it were. Watch the newspapers for a period of time and clip descriptions of such cases.

CHAPTER XXII

SOMETHING ABOUT THE FEEBLE-MINDED

How Many are There?—Are They Like the Rest of Us?—Why They are a Serious Problem—The Morons—The Morons in News—What is Being Done for Them—Feeble-mindedness and Mental Disease—What Can be Done for the Feeble-minded—Feeble-minded Families.

"COMFORT the feeble-minded," wrote the apostle Paul, in one of his epistles to the churchmen at Thessalonica. Granting, for the sake of argument, that Paul used the term feeble-minded as it is now used he was correct. That is about all one can do for them. That is why these weaker creatures of God are all the more pitiable.

There will be no advances made by taking a sentimental attitude toward these people. They must be studied with the impartial mind of science. And it is important that they be studied. As mentally defective citizens, they constitute a problem of enormous national importance. As regulars or recruits in the vast armies of the criminal, the prostitute, and the pauper they cannot be passed by with a faint heart full of pity and a wonder at why they should be among us. The feeble-minded are a natural phenomenon, representing not God's wrath, but the wiles of a frequently freakish natural selection.

There are, at the least, several hundred thousands of feeble-minded in the United States. Conservative estimates, based upon the findings of the army psychologists, place the number of feeble-minded in the states at the 650,000 figure. It is quite probable that this number is not an overestimate. For example, several years ago in Massachusetts it was estimated that there were about 6,000 of these mental defectives in the whole state. Almost everyone, except those who did the calculating, was certain that this was a gross exaggeration. Contrast this "ridiculously absurd estimate"

with the fact that, at present, in the same state they now have the names, addresses, and other significant information about 12,000 persons who are definitely known to be feeble-minded.

If the feeble-minded were like the rest of us, these figures would mean but little. But that is not the case. The feeble-minded are men, women, and children whose minds have not, and never will in all probability, develop to the same degree of usefulness as ours have. They will always be people with the body of a grown person directed through life's changeable weather by the mind of a child.

WHY THE FEEBLE-MINDED ARE A SERIOUS PROBLEM

This is precisely why the feeble-minded are a great source of social problems. Of course, one must naturally feel sadly about

Characteristics of the Various Degrees of Feeble-Mindedness

	MENTAL AGE	EDUCATIONAL	SOCIAL	INDUSTRIAL
MCRONS	8 to 12 years	Seldom get beyond fifth grade in school	Can earn a living under favorable conditions but cannot compete with normally developed people	Able to care for animals and run simple machinery; can run errands; cannot plan work
IMBECILES	3 to 8 years	Cannot read or write	Incapable of earning a living; can guard themselves against common physical dangers such as burns or dodging missiles	Can perform simple short tasks; dust or wash dishes; perhaps run errands but only around house
IDIOTS	1 to 3 years	Usually unable to talk; use only a few words at most	Totally unable to make even a part of his living; cannot guard self against common dangers, cannot even dodge missiles	Usually totally helpless; may or may not be able to walk; may play a little

their sad plight; but it is a more serious affair than any superficial sympathy might indicate. **An adult's body and a child's mind** do not harmonize very well in everyday life. In mediæval times such a person might have found favor as the court jester, but in these ultra-democratic days there is no longer such a royal road to fame. In this work-a-day world, when the mind is so far behind the body

in development that it is only equal to that, say, of a seven-year-old child, it is impossible for the body to be directed wisely enough by this feeble mind to earn its own keep.

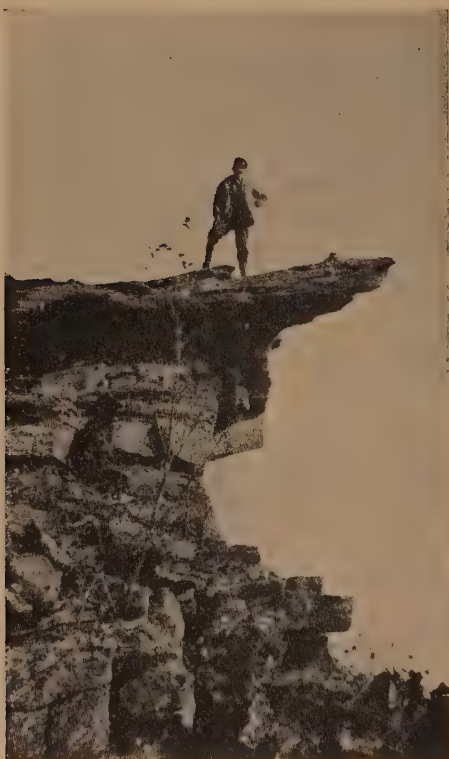


FIG. 47.—This feeble-minded boy won the medal of The American Forestry Association, for tree planting. In many occupations the feeble-minded under supervision can compete with normal workers.

The result is that many of the feeble-minded are living a peculiarly parasitic existence. Many, many of them have to be continuously and completely cared for by fond parents or a stern state until death eventually ends their unharmonized existence. Still others are far from being self-supporting. As society is now organized, very few of the feeble-minded can earn their own livelihood.

All the feeble-minded, especially the higher grades, are a potential source of social evil and misconduct. Large numbers of them are actual malefactors. Nation-wide surveys have demonstrated that well nigh fifty per cent. of the professional prostitutes are definitely feeble-minded. Surveys of

penal institutions reveal mental defects amounting to feeble-mindedness among approximately one-fourth of the prisoners. Alms-houses also have an abnormally large number of mental defectives among their guests. **The feeble-minded are not born bad nor totally depraved.** The trouble is that one of the characteristics of feeble-mindedness is an inability to use good judgment in dis-

tinguishing right from wrong. In even mildly severe cases of mental defect, the individual is incapable of seeing into the future and anticipating the outcome of his acts.

As a result of this incapacity, they are easily led on and made the tools of unscrupulous persons. They easily become habitual criminals and prostitutes. They are always getting caught, however, for they do not have the intelligence, in most cases, to cover their tracks and thus evade the long arm of the law. And they further differ from the normally matured person in being unable to profit appreciably by their past experiences. The feeble-minded are short both in foresight and hindsight.

The most obvious thing which should be done is to place the mentally defective under the **supervision** of persons who understand feeble-mindedness. Then it can be seen to that they form the proper habits of conduct and are in occupations for which their weakly developed minds fit them. This is largely the **secret** of the education of the feeble-minded. Education, in their case, is more habit training than divulgent information.

THE MORONS

This is not a pessimistic picture which is being presented—unless the facts themselves are depressing and unpromising. It is not a bad everyday sort of a working philosophy to believe that even the darkest cloud has its tinted lining. Such is the case as one studies these mistakes of Nature's great workshop. There are a large number of the feeble-minded whose mentality is not so badly underdeveloped as one might presume. When their minds are equal to those of children from about eight to twelve years of age they are modernly called **morons**. As a rule, a moron is capable of earning his own living in a line of work that does not require much mental effort or head-work and which involves but little competition with their normal fellows.

This term moron was brought into our modern vocabulary from the Greek by Dr. Henry H. Goddard. He felt the need of a distinct term to designate this group of intellectuals among the feeble-

mind—*for presumably even the group of "intellectuals" is largely a matter of relativity—and selected the ancient word for a fool. This term has been brought into general usage so recently that one is somewhat taken aback at being unable to find it even in some of the more recent dictionaries. The group of feeble-minded that it designates, however, is none the less real for this oversight on the part of the dictionary makers. The real menace of the feeble-minded is due to the moron. The idiot and the imbecile are, ordinarily, too stupid to be of much positive social harm. Theirs are largely sins of omission. But the morons have just enough intelligence to be rather vicious rascals when they get the notion or the experience, and they still do not have quite enough intelligence to foresee the outcome of their misbehavior, both personal and social. So the moron prostitute continues prostituting, and the gangster gangstering; the dirty alley dweller does not move, and the pauper continues paupering. So far as the moron himself is concerned, his deficient intelligence is satisfied by these modes of living and acting and he follows the path of least resistance.*

One would almost think that the news reporters had discovered the moron. As the morning paper is perused, the headings inform the unwary reader that a moron did this or a suspected moron is being held for that, or a moron is being hunted in connection with this other. And so it goes from edition to edition. Reporters, from cub to veteran, have keen insight into human nature. Not only do they have a nose for news, but they can diagnose moronity from a news item, while it takes a skilled and conscientious psychologist several hours at least. And, of course, such news value as the press give the moron serves to enhance an already murky estimation of him, or her—for mental defect, even as politics and the income tax, is no respecter of sex.

Undoubtedly this unwarranted news misrepresentation of the reporters' made-to-order morons is responsible for many an exaggerated conception of their nature and needs. Under supervision of the proper sort, the morons are not getting into trouble with the law and with their neighbors. They do not then have to be entirely

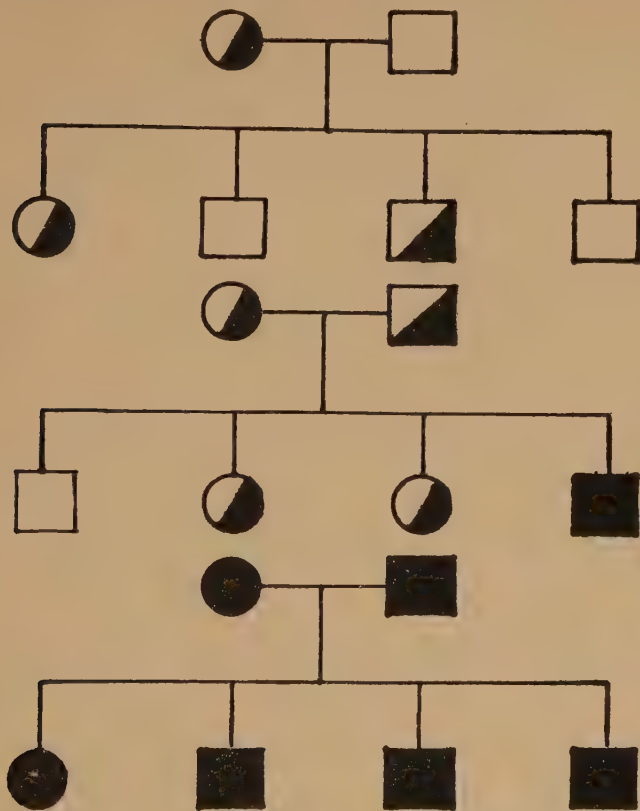


FIG. 48.—Inheritance of Feeble-mindedness:—Showing how apparently normal people may have feeble-minded children, and how all the children of the feeble-minded are also feeble-minded.



Normal.



Seem normal, but carry an hereditary trait of feeble-mindedness.



Feeble-minded.

Circles represent women and squares men. Each chart shows the probable mental development of the children of the parental combination represented in the two figures connected by a cross-bar.

supported by the state, for they can earn a large part, if not all, of their keep. Many of these actual mental defectives of the moron grade have been found capable of earning a living and keeping out of conflict when they are properly supervised in their haunts, habits, and associates. As a matter of fact, in some states, such as New York, the state schools for the feeble-minded have established working colonies away from the institution. These are, of course, under the immediate guidance of persons who have had years of experience in the custodial care of the feeble-minded. But at that, these colonies get along famously, and their labor is a source of revenue, thus relieving in part the groaning taxpayer.

WHAT IS BEING DONE FOR THE FEEBLE-MINDED

In the face of the most optimistic attitude, it must be frankly admitted, however, that a very large per cent. of the feeble-minded are being or should be cared for by the state. Others who are as yet unrecognized as defective, by their misconduct are another great source of expense and trouble. It would be beside the point to jolly ourselves along in this respect. The situation which they present is one of immense importance, and it must be faced in frankness. The care and support of 40,000 mental defectives in state institutions is a serious matter in itself. Many more of these defectives are burdens to enslave parents and are economically unproductive. Those whose mental defect is less than that of a moron usually need to be cared for like children. This pertains especially to imbeciles, and more especially to idiots. They are a complete social burden, and seldom even partially self-supporting unless some understudy of Barnum finds them. But they are seldom breaking laws, for they usually do not have the intelligence nor the freedom of action which is necessary.

Concerning the care of the feeble-minded by the states, much could be said. At present, four times as many persons are being cared for in state institutions for the mentally defective as are engaged in manufacturing establishments in the State of Arizona. That is only a part of the story. Admittedly, not a single state in

the Union is providing care for all those mental defectives within their borders who need care; as a rule only those with the severer forms of defect are turned over to the state schools. The others are uncorrallled and lead an unsupervised existence, unless they are found in almshouses and correctional institutions.

Ample evidence is available to indicate that statistics from state institutions tell only a small fraction of the story. The findings of the army draft are in point. Army psychologists found almost as many feeble-minded rookies as there were mental defectives in the state institutions. This is excluding second lieutenants. These army findings were just for a limited age group and for one sex only!

We may take Alabama and New York as representative of affairs in general regarding the adequacy of state care for the feeble-minded. In the former state there was no state institution for the feeble-minded at the time of the army drafts. No mental defectives in Alabama? Hardly! Among the males of draft age psychologists found over a thousand feeble-minded who hailed from Alabama. At present, a State Home and School for mental defectives is being constructed near the Bryce Hospital at Tuscaloosa.

The other state, New York, probably is providing care for more feeble-minded than any other state in the Union. But at that, only one of the many handfuls of mental defectives are being cared for in the Empire State. Estimates based upon the findings of the army draft place the number of feeble-minded, outside of institutions in New York, as over 40,000. This, of course, includes both sexes and all ages and races. To be able to cope with such an immense problem a special commission has been appointed to guide the state in its dealings with these feeble-minded.

FEEBLE-MINDEDNESS AND MENTAL DISEASE

The feeble-minded are commonly confused with the mentally diseased. They are entirely distinct. The mind of a feeble-minded person has never reached a normal development, and in all probability it never will; it is just an underdeveloped mind. The

mentally disordered, on the other hand, have at some time or another had a fully developed mind ; but with the coming of their disorder, certain aspects of their mental life gave way, or began working in unusual manners.

As far as looks are concerned, quite commonly it is impossible to distinguish the mentally defective from their normal brethren. One cannot tell by **looking at a person** whether or not he is defective mentally. The more severe grades of this defect are accompanied by a characteristic dull, apathetic appearance. But the higher grades, such as the morons, may have a deceptively bright and attractive appearance. One can tell feeble-mindedness about as accurately from the back of a picture as from the front.

A careful scientific examination is necessary to determine the kind and amount of mental retardation present. A duly qualified psychologist or a properly trained physician, can tell, after a detailed mental examination whether the difficulty is a mental defect, as in feeble-mindedness, whether it is a case of mental disease, or whether it is mental at all. It is essential that a thorough examination be made of each suspected case, for the treatment and care varies according to the nature of the trouble.

Obviously it is desirable to reduce the number of feeble-minded to as low a figure as possible. They are a social menace, an economic drain, a permanent army of the unemployed. In a democracy, all persons enjoying the privileges of citizenship should be productive in labor and mental efficiency. But here is where the feeble-minded are indeed a menace. Only a very few of them, at most, can ever be brought to even an approximately normal development of mind. The feeble-minded cannot make progress in ordinary schools ; they need special schools with specially trained teachers. Even with these special facilities and attentions, they can be expected to improve but little at most. About all that can reasonably be expected is to train them in the right habits. Their lives are dominated by habit rather than intelligence, and the key to their successful education is in supervising the formation of their habits.

WHAT CAN BE DONE FOR THE FEEBLE-MINDED

While it is admittedly impossible at present to cure feeble-mindedness, much can be done to prevent its occurrence. This is to be accomplished largely by avoiding the influences which cause this condition.

There are some types of mental defect, for example, which are caused by a **deficiency in the thyroid secretion**. Most of such cases improve greatly when extracts obtained from normal thyroids are administered. Simply supplying in an artificial way the substances which their own thyroid fail to supply them brings about a marked improvement in their mental development. Very rarely, however, can they be brought up to a normal degree of mental development.

Other causes of mental defect are acquired. That is, they are caused after birth, and by some factors not inherited through their parents. **Severe fevers** or other grave illnesses in childhood sometimes have as a sequel the cessation of the development of the mind. This means that in case where the severe illness occurred at six years of age, the mind develops but little after this, and the person may later have the mind of a seven-year-old child in a grown-up body.

But by far the greatest causative factor in the occurrence of mental defect is **heredity**. Almost all feeble-mindedness is inherited, inborn, and present in several generations of the family. If one parent is mentally defective, the chances are that many of the children will also be defective in mentality. The parents may apparently be normal, but some of their children may be defective, because one of the grandparents or perhaps one of the great grandparents was defective. In a case like this, one of the parents transmitted the trait to the child, although the parent was apparently normal.

There have been numerous elaborate investigations made into the inheritance of mental defect. These all agree in finding that the hereditary factors for mental defect behave in a typically Mendelian fashion. Some of the more extensive studies have traced

back through several generations of feeble-mindedness to one man or woman who was the source of all the generations of mental defect with their resulting poverty, crime, misery, and innumerable social problems.

One of the earliest studies of this nature was that of the Kallikak family through many generations. The ancestors of a feeble-minded girl were traced back to the time of the Revolutionary War. Then it was found that a young soldier met a feeble-minded barmaid and was father to a son by her. There were 480 descendants of this union traced in 1912. Of this number 143 were *known* to be feeble-minded and probably many others were defective or at most on the border-line. Criminals, prostitutes, and alcoholics galore were found in the family line of these descendants of the youthful soldier and the half-witted barmaid.

But in a way, this is a remarkable story. After the war, this same soldier married a normal girl. There were 496 descendants of this union traced. There was not a single feeble-minded individual in this branch of the Kallikak family line. There were many physicians and lawyers, even judges. There was no criminality, no immoral women. Compare this record with that of the other line of descendants of Martin Kallikak!

If this record could be translated into terms of the cost in dollars and cents, it would probably cause us to gasp in astonishment. A somewhat similar family has been studied in New York state. It has been calculated that in seventy-five years the degenerate and feeble-minded Jukes cost that state about a million and a half dollars! And that does not include the further descendants of this defective stock!

The one obvious way to prevent the occurrence of the bulk of mental defect is to prevent mentally defective persons from rearing children. Children of such people are almost invariably feeble-minded, or will transmit their defective qualities to future descendants, if not to the immediate line. Still, there are very few states which make any attempt to prevent these persons from having children; and as a rule, the feeble-minded have unusually large families. These large families mean that the social burden of

mental defect increases rapidly, unless methods are used to prevent its further incidence.

The feeble-minded, without exception, should be prevented from becoming parents. They should without exception be supervised by the states so that they may be kept engaged in some gainful occupation for which their meagre mental equipment qualifies them. Those who cannot be so engaged need actual institutional care. They all need to have the proper habits of conduct formed which will keep them from becoming violators of the social code or becoming social misfits. It is entirely possible for mental defectives to become fairly good citizens, but it is necessary for them to have proper and long continued supervision in order that this may be accomplished. This is a task for the specially trained, not novices or devoted parents. True it is that the mentally defective, even under the best of care and supervision, can never measure up to the responsibilities of full citizenship in having anything left over, economically or intellectually, to contribute to the common weal. But at that, it is worth doing, either as a practical or as a humanitarian proposition. It is a problem which has been neglected far too long, and one which can no longer be minimized.

TOPICS FOR DISCUSSION

1. The town fool, of small town prominence, is usually feeble-minded. Describe these folks whom you have known.
2. What provisions does your state make for the feeble-minded?
 - (a) in institutions or schools?
 - (b) does it supervise them in industry?
 - (c) does it provide special classes for them in the public schools?
 - (d) is marriage permitted among them?
3. What procedure would you recommend that your state take to prevent breeding feeble-mindedness? Would you recommend segregation or sterilization? Why?
4. About half of the inhabitants of penitentiaries are feeble-minded. Does this mean that the feeble-minded commit half of the crimes or that they are caught easier?
5. Describe some families you have known in which mental defect seemed to run in the family. Recall and tell about some others in which superior minds seemed to run in the family.

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